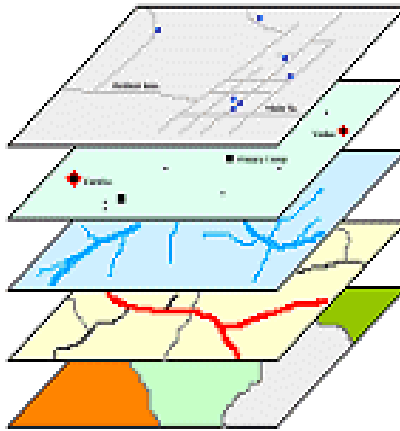


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Development of a Washington State Freight Data System



Washington State Department of Transportation

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Development of a Washington State Freight Data System

Prepared for the
Washington State Department of Transportation
Office of Freight Strategy and Policy

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August 2007

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Executive Summary

Recommendations

This study has identified freight data uses, needs and gaps nationally and in the State of Washington. Specific recommendations of a framework to provide the needed data and data generating processes include the following:

- **Phase I: Identification of Data Gaps, Needs and Uses (Time Frame: current and on going)**

A periodic and continuous inventory of available freight data relative to identified freight data needs should be performed throughout the state and region. This process may be incorporated into the expected activities/duties proposed in these recommendations.

- **Phase II: Librarian/Educator, Resource to Manage Freight Data Warehouse (Time Frame: within six months)**

This individual/resource, in addition to being a “data source” for the state, would also reach out to all agencies and businesses requiring or holding transportation flow and operational data, participating in discussions as freight data needs arise in the State.

- **Phase III: Freight Database Manager, Technical Resource (Time Frame: within one year)**

The Freight Database Manager will design/develop and maintain the freight data warehouse for information that is to be housed internally within the WSDOT, creating a freight data repository that is updated and maintained into the future.

- **Phase IV: Dedicated Funds for Operations/Data Development (Time Frame: year one and on going)**

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The fourth phase of this proposal is to dedicate resources to design, develop and implement freight data collection efforts addressing identified deficiencies. A continuing component of this effort will involve developing relationships with private or quasi public firms in order to learn from them their desired transportation system performance and their needs, and earning the confidence of these decision makers.

Background

At the heart of effectiveness and efficiency in the U.S. transportation system, especially for that of freight, is the data that support transportation investment decisions, prioritization, and overall policy development at the national, regional and local level. Very little systematic data exists to inform decision makers about the economic impact, system bottlenecks, and supply chains flowing through freight systems that support Washington State producers and delivery of goods to consumers.

Many public and private sector entities collect some data on goods movement. However, there is no linkage among these different sources and some information isn't collected by anyone. In addition, the combination of data from different sources, known as "data fusion," raises concerns about quality and comparability of the resulting fused data. What is needed is a blueprint for WSDOT to collect timely and complete freight data, across all modes and supply chains, in order to maximize efficiency of the state's freight system and preserve the state's economic vitality.

Freight Data Literature Sources and Survey of Other State DOT's Data Collection and Needs

An inventory of 32 (many multiple data series are available from these sources) major freight data sources is listed and documented, classified by International,

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National and State freight movements and inventoried by public or private source and as to the detail and availability of the specific data. This information is also concentrated, characterized and presented in five tables that will be available on WSDOT's web site.

The broad inventory of freight data sources was further supplemented with a survey of other state Departments of Transportation from 15 states as to freight data usage and needs throughout the U.S. Over all, the stated need was for a coordinated approach to data generation, at the policy, program and project level, as the data needs are addressed

The State of Washington's Data usage and Needs

Two freight data discussion group meetings of in-state data users were held within the state, one each on the west and east side of the state. It is evident that a wide array of information is utilized by these agencies throughout the state, with some common freight data challenges expressed by most participants. The detailed responses for each organization for both freight data uses and needs are presented in Appendix A.

The Freight Data Framework for the State of Washington

A summary of the freight data gaps, and the tools and approaches to addressing these gaps is presented in the last chapter, leading to the development of the proposed freight data framework for the state of Washington and a process over time by which these freight data needs and gaps are addressed in the future.

The recommended overall freight data framework is presented schematically below, where a new Freight Data Librarian/Educator leads the overall effort and is supported by a Database Manager. Collectively this group will

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inventory/catalog existing data sources (local, state and national) and also coordinate future freight data collection efforts. The Database Manager will provide technical database management support while the Librarian will interact with state freight clientele (to develop freight data partnerships) and policymakers at the state and national level. Freight transportation research efforts at area Universities will also interact with the framework, especially to the extent new/additional data are generated. The following Phases offer a freight data framework approach that would vastly improve freight data accessibility and build knowledge/expertise within the region/state/nation for a variety of policy, planning and project uses across agency uses.

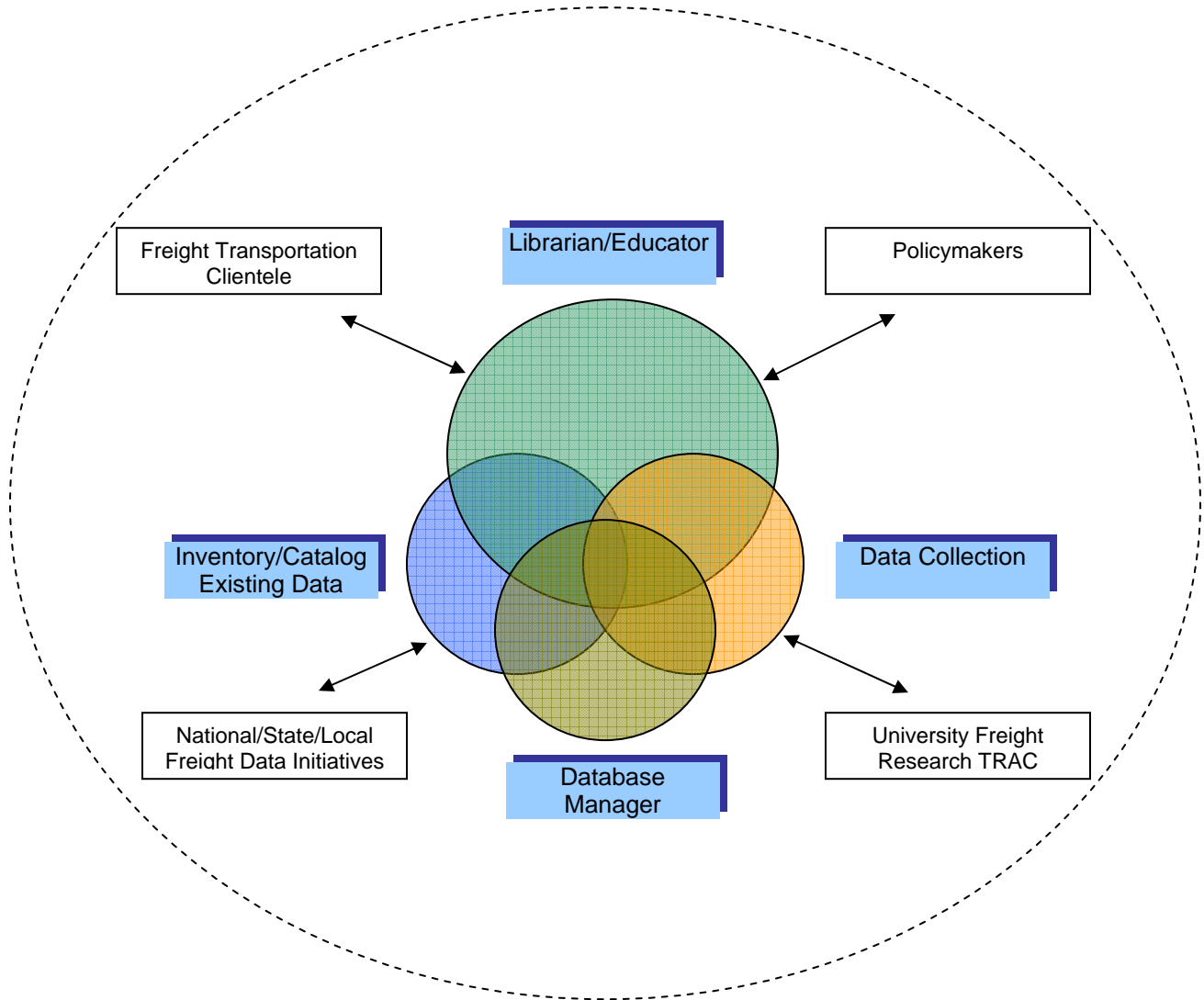


Figure 2A: Washington State Freight Data Framework*

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*The horizontal blue text boxes indicate the recommended activities and the vertical blue text boxes show recommended personnel additions. The upper white text boxes identify the clientele and the lower white text boxes present the data sources. The circles indicate the extent of interaction of the different actors and activities.

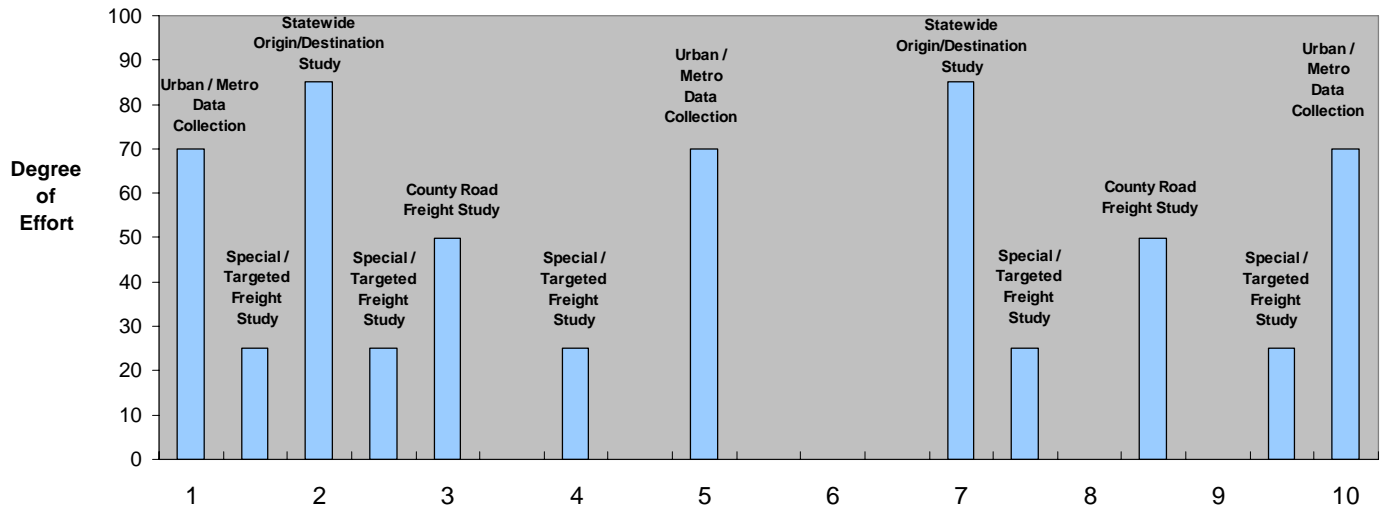
Data Generation and Timeline

Origin and destination studies, of carriers, shippers or receivers, are an ongoing need in the State. Both statewide and local distribution movements suffer the most from data gaps. Updating the statewide survey with a carrier survey appears to be the most manageable and productive. A survey every 3 to 5 years would provide current data that reflect the dynamics of the transportation system serving the shippers and carriers of the State. This could be supplemented by similar surveys, done on a rolling basis (one survey done every year or so) at the local distribution level, so that every five years every area would be covered. These surveys would be refined on focused corridors in an “as needed” basis within that time period.

The data collection efforts may be sequenced into the future such that data gap/needs are addressed on a continued basis and allowed to capture the dynamic changes which occur. A recommended blueprint of WSDOT’s timeline is presented in Figure 3A, where four separate types of efforts are implemented on a revolving basis, as needs require and budget resources allow.

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Figure 3A: Proposed WSDOT Data Collection Efforts Through Time



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Introduction

The U.S. transportation system is continually responding to new and increasing demands while globalization, competitive industry trends and new technologies increase freight volumes and change the dynamics of freight transportation.

Transportation security concerns, congestion, and increasing volumes of passenger traffic increase the demands on this system while lowering the productive efficiency of the system. This multi-modal transportation system supports the economic vitality of the nation.

At the heart of effectiveness and efficiency in the transportation system, especially for that of freight, is the data that support transportation investment decisions, prioritization, and overall policy development at the national, regional and local level. As recognized by the Transportation Research Board, data on goods and freight movements are needed to identify and evaluate options for mitigating congestion, improving regional and global economic competitiveness, and enabling effective land use planning. Other needs are to inform investment and policy decisions about optimizing system efficiency, enhancing transportation safety and security, and reducing fuel consumption while improving air quality

Substantial components of national data do exist to generally understand and provide context for freight systems that support international trade through Washington gateways; yet, very little systematic data exists to inform decision makers about the economic impact, system bottlenecks, and supply chains flowing through freight systems that support Washington State producers and delivery of goods to consumers. For example, the Washington Freight Transportation Plan mentions that up to 80 percent of all urban truck trips are made by smaller and medium-sized trucks in the local distribution system- but the Washington State Department of Transportation (WSDOT) and Washington cities typically don't have local flow or origin-destination information readily available.

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TRB points out that, at all levels, existing freight data and collection efforts by many diverse agencies are not coordinated, and the results not dispersed among all agencies needing the data. As a result, these data do not completely address business needs. Many public and private sector entities collect some data on goods movement. However, there is no linkage among these different sources and some information isn't collected by anyone. In addition, the combination of data from different sources, known as "data fusion," raises concerns about quality and comparability of the resulting fused data. Once a linkage is determined, data gaps and inconsistencies may be recognized and solutions to solve these problems identified. Thus, a search for a freight data framework at all levels is needed.

TRB's concept, as seen in Figure 1 below, puts emphasis on customer input and supply chains, rather than the traditional notion of modal analysis. Washington State University's Strategic Freight Transportation Analysis (SFTA)'s multiple studies provide important origin-destination information on mainline long haul routes and some on intra city movements but many specific movements have to be inferred from the general SFTA origin-destination data. WSDOT has also completed a first ever statewide shipper and carrier survey in August 2004, using interviews and focus groups.

However, these are but several pieces of the puzzle and much more information is needed. At the regional level, more flow data is needed and, while some regions conduct freight-related studies, freight data development is not uniform across all regions of the state. Air cargo is another identified area where little detailed data is available, except by the air companies themselves.

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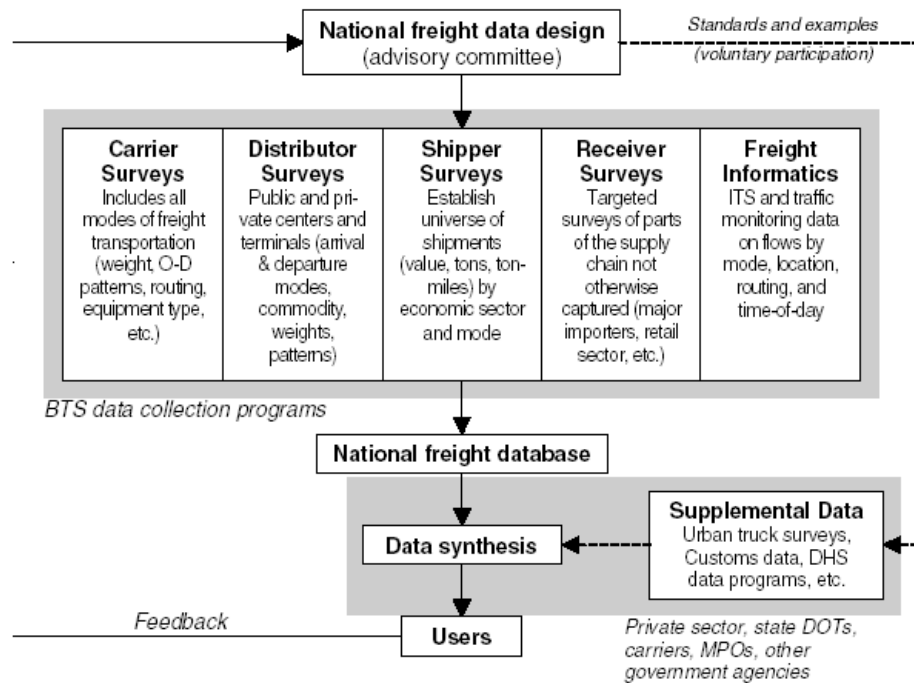


Figure 1: National Freight Data Design

What is needed is a blueprint for WSDOT to collect timely and complete freight data, across all modes and supply chains, in order to maximize efficiency of the state's freight system and preserve the state's economic vitality. Such a system should construct the linkage among users, generators, and archivists of the data. It should also propose maintainable solutions to fill in the gaps and allow for data fusion. This blueprint is particularly important because of the increased focus on customer requirements and supply chains related to Washington's global gateways, manufacturers and producers, and local distribution system, all of which are currently data deficient to some degree.

Project Objectives

The overall goal of this project is to support economic activity in the state and to maximize efficiency of the state's transportation system by creating a blueprint of

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available and needed data to address critical freight planning and management questions. It will also propose methods to collect timely and complete freight data in an efficient and effective manner. Specific objectives to achieve that overall goal include:

1. Identify general data inventory warehouse design, and system architecture, based on WSDOT's system software and design criteria.
2. Determine approaches, experiences, and attempted solutions used by the Federal government and other states and regions.
3. Inventory and specify freight data needs and data sources for the state and region, including the where, what, why, how, and when of these needs.
4. Inventory current data within the state and determine gaps, redundancies, inaccuracies and weaknesses in current data collection in the state (supply chains, corridors, modes, industry, trade flows
5. Develop a plan to fill data gaps and present a maintainable, systematic, and coordinated data collection system.

Report Structure

This report presents the findings of the research effort. Chapter one presents the results of the review of literature relating to data sources and structure. The following chapter presents the results of a survey and interviews with various states, detailing the approaches used and structure within the state departments of transportation for data generation. Chapter three looks to the data gaps

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specific to the State of Washington that have been found, based on the earlier work and subsequent workshops with practitioners in the field. The final chapter presents a data plan for the State of Washington reviewing how the gaps are to be filled, discusses assignment of responsibility, and suggests potential funding timing.

Chapter I: Freight Data Sources

The need for freight data and search for current available sources has received much attention at the Federal level over the past five years. Various conferences, research projects and state planning bodies' activities have generated a shotgun approach and scattered results in the data arena.

Various ways of classifying the data have been offered, including the Federal approach mentioned above where the data are segmented by the source/methodology of the data collection. An accompanying approach to classifying the data, rather than looking at the different participants in the supply chain, is to look at the type of data being generated, typically segmented into origin-destination data, performance data and documentation data. Origin-destination data, like the two state wide surveys and various industry surveys conducted by Washington State University under the EWITS and SFTA project, provide trip and vehicle information dealing with an individual trip. Such data can be used in modeling freight flows, statewide, locally and even regionally.

A second category needed in policy analysis is performance data such as time in transit, speed, delay, reliability, cost, and access. Such information is useful in determining congestions points, bottlenecks, and costs of delay from recurring or unexpected events. Such information, if captured overtime, allow evaluation of the benefits of improvement projects.

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A final category, documentation data, is one captured to aid managers of the transportation systems in monitoring and improving the performance of the system under the manager's control. Such data include truck configuration, size weight over time, tonnage hauled on a road segment and other operational performance measures.

The overall concern is not that data are not available but that these data are not complete, are sometimes duplicative and many times may be in conflict with each other. As will be noted in the following sources, the goals of the data gatherer need to be considered as the data are reported or used for any purpose other than the initial source. These data range from large data gathering activities undertaken by the national government to significant state efforts to metro urban surveys to local planning organization/port studies. These selected data come from a variety of data sources, including the web sites of the major sources as well as various earlier surveys of existing data production points. The overall focus is to determine what is available from these different sources for Washington State decision makers. The overall categories of sources range from the general/macro to the specific areas of the state of Washington.

International Freight Movements

There are multiple sources of data explaining international flows across the borders of the United States and its neighbors. Some of the primary sources are listed below, organized by public and private sources and listed alphabetically.

Public Data Sources for International Movements

Airports Council International (ACI)

Air cargo movements for all major airports in the world are presented annually in the **Worldwide Airport Traffic Report** by the Airports Council International (ACI)

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of Geneva, Switzerland. An annual survey by ACI produces information by airport, weight, mode and type of commercial operation on a monthly and annual basis. Some concerns of the reporting of transshipment statistics have been noted. The data can be purchased for a fee at: <http://www.airports.org/e-commerce/memb.htm>.

Bureau of Transportation Statistics: U.S. Department of Transportation

The **Transborder Surface Freight Data Series** is produced by the Bureau of Transportation Statistics of the U.S. DOT, covering all states and specific detail on 20 cities. It provides North American merchandise trade data by commodity type, by surface mode of transportation (rail, truck, pipeline, mail and other), and with geographic detail for United States (U.S.) exports to and imports from Canada and Mexico. These data, available since April 1993, are a subset of official U.S. international merchandise trade data. The purpose of the data, updated on a monthly basis, is to provide transportation information on North American trade flows. This type of information is being used to monitor freight flows and changes to them since the signing of the North American Free Trade Agreement (NAFTA) by the United States, Canada and Mexico in December 1993.

Table 1: Public Sources for Information on International Freight Movements

Agency/ Organization	Data/Report	Information Description	Modes	Update Frequency	Format	Source
Airports Council International	Worldwide Airport Traffic Report	Air cargo movements for all major airports in the world	Air	annually	annually	http://www.airports.org/e-commerce/memb.htm
Bureau of Transportation Statistics of the U.S. Department of Transportation	Transborder Surface Freight Data Series	Air cargo movements for all major airports in the world provides North American merchandise trade data by commodity type, by surface mode of transportation (rail, truck, pipeline, mail and other), and with geographic detail for United States (U.S.) exports to and imports from Canada and Mexico	Air, rail, truck, pipeline	annually	monthly	http://www.census.gov/foreign-trade/www/ftd.stat.guide.html
Foreign Trade Division of the U.S. Department of Commerce and U.S. Census	U. S. Census Foreign Trade Statistics	statistical information on United States export and import trade	Ocean, Air	annually	monthly, yearly, historically	http://www.census.gov/foreign-trade/reference/products/catalog/port.html http://www.census.gov/foreign-trade/reference/codes/sitc/sitc.txt http://www.census.gov/foreign-trade/www/index.html
Maritime Administration (MARAD) of the USDOT	U.S. Exports and Imports Transshipped via Canadian Ports	Total value and estimated weight of commodities transshipped via Canada by port of entry and exit or foreign country of origin/destination	Ocean/barge	annually	annual basis, with a normal lag time of one to two years	http://www.marad.dot.gov/MaradStatistics/index.html
Massachusetts Institute for Social and Economic Research (MISER)	U.S. Exports by State of Origin of Movement	States of origin of movements of the export shipments and the foreign country of destination provide detailed shipment flows	Air, ocean	quarterly and annual, lag time 3-6 mos	quarterly, annually	http://www1.miser.umass.edu/trade/statex.html
Statistics Canada	For-Hire Trucking (Commodity Origin and Destination) Survey	Provides commodity movements and the outputs of the Canadian trucking industry.	Truck	annually	quarterly	http://www.statcan.ca/Daily/English/040707/d040707b.htm
U.S. International Trade Commission	USITC Interactive Tariff and Trade Data Web	provides international trade statistics and tariff data on a self-service, interactive basis, responding to user-defined queries integrating international trade statistics with fairly complex tariff and customs treatment	Air, truck, ocean, barge	annually	monthly, quarterly, annual and year-to-date	http://dataweb.usitc.gov/

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This dataset incorporates all statistical shipments entering or exiting the U.S. by surface modes of transport (other than air or maritime vessel) to and from Canada or Mexico. Statistics are available from the Government Printing Office and on the Census Bureau's web site at: <http://www.census.gov/foreign-trade/www/ftd.stat.guide.html>.)

The Transborder Freight Dataset is extracted from the Census Foreign Trade Statistics Program. Historically, these data were obtained from import and export paper documents that the U.S. Customs Service (Customs) collected at a port of entry or exit. However, an increasing amount of import and export statistical information is now being captured electronically. The Automated Broker Interface System (ABI) collects approximately 98 percent of the value of all U.S. imports electronically. On the export side approximately 80 percent of the value of all U.S. exports is collected electronically (of that, 35 percent is collected through the U.S./Canada Data Exchange and 45 percent through the Automated Export System (AES)). The data in the Transborder Surface Freight Dataset are captured from these same administrative records.

U.S. Census Bureau

The **U. S. Census Foreign Trade Statistics** issues statistical information on United States export and import trade, usually in a monthly, yearly or historical basis. Information on up to 18,000 import commodity codes, 9,000 export commodity codes, 240 U.S. trading partners, 400 U.S. ports, over 50 states and territories, and 45 districts is available. Some of the statistics include quantities, values, shipping weights, methods of transportation (air or vessel), duties collected, unit prices, and market share. This foreign trade data can be provided in different formats based on several commodity classification systems, including the Harmonized System (HS), Standard International Trade Classification (SITC), North American Industry Classification System (NAICS), and End-Use Commodity Classification System. Relevant sites include:

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<http://www.census.gov/foreign-trade/reference/products/catalog/port.html>

<http://www.census.gov/foreign-trade/reference/codes/sitc/sitc.txt>

<http://www.census.gov/foreign-trade/www/index.html>

The data are available from, and are the responsibility of, the Foreign Trade Division of the U.S. Department of Commerce and U.S. Census. Information on U.S. exports of merchandise are compiled on a transaction basis from the Shipper's Export Declaration (SED) or its electronic equivalent as filed by qualified exporters, forwarders, or carriers. These data measure the physical movement of merchandise out of the United States to foreign countries.

Historically, no information was compiled from the SED as to the state from which the goods were shipped. Only volume and type of commodities were exported, through which U.S. Customs districts/ports, and to which countries was known. In 1985, a new field indicating the state where the export journey begins was added to the SED. Later, an existing field, the ZIP code of the exporter's address was used to develop a series based on exporter location (Note that the data reflect the location of the firm's office, not the location or origin/destination of the movement itself, decreasing its value for understanding freight flows).

These fields allowed compilation of the following state exports series:

- State of the Exporter Location (EL) Series -- 1993 to December 2002.
- State of Origin of Movement (OM) Series -- 1987 to Present

Because of significant shifts in the EL series beginning in 1999 the series was discontinued as of January 2003 statistics. These shifts should not affect the OM series.

Users of the OM series, available since 1987, should note that it provides export statistics based on the state from which the merchandise starts its journey to the port of export; that is, the data reflect the transportation origin of exports. In

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certain cases, the origin of movement is not the transportation origin. Whenever shipments are consolidated, the state of origin of movement will reflect the consolidation point. This effect is particularly noticeable for agricultural shipments. Intermediaries located in inland states ship agricultural commodities down the Mississippi River for export from the port of New Orleans. In this case, they would report Louisiana, the state where the port of New Orleans is located, as the state of origin of movement.

The primary impact of this data limitation for Washington is on the state distribution of non-manufactured exports, which are generally exported by intermediaries. The most visible result is a tendency to understate exports from some agricultural states and to overstate exports from states like Louisiana that have ports that handle high-value shipments of farm products. The series DOES NOT represent the production origin of U.S. export merchandise. In some cases considerable manufactured exports are attributed to states that are known to have little manufacturing capability. One reason is that commodities produced by out-of state suppliers can be shipped from in-state distribution centers. Another factor is shipments of manufactured commodities from in-state warehouses and other distribution centers that are arranged by exporters located out-of-state. In both cases, manufactured exports from the non-industrial state are magnified in the OM series.

Maritime Administration (MARAD) of the U.S.D.O.T.

The Maritime Administration (MARAD) of the USDOT produces the **U.S. Exports and Imports Transshipped via Canadian Ports** database on an annual basis, with a normal lag time of one to two years. Total value and estimated weight of commodities transshipped via Canada by port of entry and exit or foreign country of origin/destination. Some of the data are available on:

<http://www.marad.dot.gov/Marad Statistics/index.html>.

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Massachusetts Institute for Social and Economic Research (MISER)

The Massachusetts Institute for Social and Economic Research (MISER) has compiled and made available the **U.S. Exports by State of Origin of Movement** database. Both statewide reports and data files can be obtained by <http://www1.miser.umass.edu/trade/statex.html>. Census data. The data set includes quarterly and annual data of over 200 countries, with a lag time of reports of 3-6 months. States of origin of movements of the export shipments and the foreign country of destination provide detailed shipment flows.

Statistics Canada

The **For-Hire Trucking (Commodity Origin and Destination) Survey** is produced by Statistics Canada on a quarterly basis and requires a fee to access the information. It is available at <http://www.statcan.ca/Daily/English/040707/d040707b.htm>.

This purpose of this survey is to measure various outputs of the Canadian for-hire trucking industry by providing estimates of inter-city commodity movements. Information is provided for shipments, revenue, weight, and distance. The survey complements the results of the Motor Carriers of Freight Survey by providing additional information.

The target population of this survey is Canada-based for-hire trucking companies with annual operating revenues of one million dollars or more, the major part of which is derived from long-distance deliveries. The For-Hire Trucking Survey is a sample survey and the sample design is based on a two-stage sample of approximately 800,000 shipments made by inter-city for-hire carriers. Once the population has been stratified according to areas of operation, type of services, commodities carried and revenue class, the first stage consists of selecting, in each stratum, a number of firms corresponding to the desired number of firms determined at the sample selection stage. The sample of firms is then converted to a sample of Document Storage Location Point (DSLPP) by including in the latter

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sample all DSLP of the selected firms. The second stage of the sample design consists of selecting a systematic sample of shipments from the files of each selected DSLP.

Responding to this survey is mandatory. Data are collected directly from survey respondents. Interviewers from Statistics Canada Regional Offices carry out the data collection across Canada.

U.S. International Trade Commission

Another major source of international trade and transportation flows is the U.S. International Trade Commission, which operates the **USITC Interactive Tariff and Trade Data Web**. Covering the customs border regions this site provides international trade statistics and tariff data on a self-service, interactive basis, responding to user-defined queries integrating international trade statistics with fairly complex tariff and customs treatment. These data are available from 1989 to the present on a monthly, quarterly, annual and year-to-date basis. Pre - defined reports on international trade statistics are also available by geographic region and partner country. Current U.S. tariffs, which are maintained and published by the USITC as a statutory responsibility, can be accessed via the USITC DataWeb, and retrieved with relevant international trade data. The appropriate web site is: <http://dataweb.usitc.gov/>

Private Data Sources for International Movements

Colography Group, Inc.

The Colography Group, inc. produces the **U.S. Air Freight Origin Traffic Statistics** which is available for fee on an annual basis. It details domestic and export air cargo shipments by weight, volume and number of shipments. It is based on state, county and market area of origin in the United States. Destination areas are only reported as domestic versus foreign shipments.

Table 2: *Private* Sources for Information on *International* Freight Movements

Agency/ Organization	Data/Report	Information Description	Modes	Update Frequency	Format	Source
Colography Group, Inc.	U.S. Air Freight Origin Traffic Statistics	details domestic and export air cargo shipments by weight, volume and number of shipments	Air	annually	quarterly, annually	www.colography.com
Commonwealth Business Media, Inc.	Directory of U.S. Importers/Exporters	a cross-referencing index of company listings by geographical location, alphabetical name and products	Air, ocean	annually	annually	http://www.cbizmedia.com/prodserve/products/?pub=DEI
	Port Import/Export Reporting Service	offers the most comprehensive statistics dating back to the 1970's on global cargo movements transiting seaports in the United States, Mexico and South America to companies around the globe	Ocean	weekly, monthly, or quarterly	weekly, monthly, or quarterly	http://www.cbizmedia.com/prodserve/products/?pub=PIERS
DRI/McGraw-Hill	World Sea Trade Service	produce detailed historical data and forecasts of cargo movements for major trade routes around the world	Ocean	quarterly	quarterly	www.dri.mcgraw-hill.com
Lloyd's Maritime Information Services, Inc.	Ship Movements Database	the only single source of information on worldwide merchant ship movements	Ocean	daily	daily	http://www.lloydsniu.com/lmiu/index.htm
Maritime Research Inc.	Chartering Annual	presents yearly listings of charter fixture information (vessel, ownership, rate, lease/charter detail, etc.), including commodity, week and trade route	Ocean	annually	daily	http://www.maritime-research.com/

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Information by final destination, routing or carrier is not part of the report. The source is available at www.colography.com.

Commonwealth Business Media, Inc.

A source of potential survey participants, rather than the data themselves, is the **Directory of U.S. Importers/Exporters**, produced by Commonwealth Business Media, Inc. Each volume is a cross-referencing index of company listings by geographical location, alphabetical name and products. Every listing provides a detailed picture of the company's trade activity, including U.S. ports of entry, countries of origin, foreign country of trading, modes of transportation, SIC codes, number and weight of shipments, product descriptions, and executive personnel contact information.

However, the database is based on the address of the exporter and not the origin of the movement so specific origin/destination connections by movement cannot be made. The main web link is:

<http://www.cbizmedia.com/prodserv/products/?pub=DEI>.

A very commonly used source of trade flows, particularly through ports, is the **Port Import/Export Reporting Service**, produced by Commonwealth Business Media, Inc., usually referred to as the PIERS data. These data are available on a fee basis. This database offers the most comprehensive statistics dating back to the 1970's on global cargo movements transiting seaports in the United States, Mexico and South America to companies around the globe. PIERS research reports monitor global shipments of goods and commodities on everything from raw materials to consumer goods. PIERS reporters throughout the country collect import and export information daily from over 25,000 bills of lading and vessel manifests.

To ensure accuracy, the PIERS quality-assurance staff audits and crosschecks shipping documentation. Shipping lines, along with importers and exporters that subscribe to PIERS, verify their own shipments and notify PIERS of any

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discrepancies among the shipment records. PIERS global trade information and niche market services are an often noted marketing and research resource tool for a variety of international businesses and organizations. The general website is: <http://www.cbizmedia.com/prodserv/products/?pub=PIERS>

DRI/McGraw-Hill, Inc.

Another source of information is the **World Sea Trade Service** produced by DRI/McGraw-Hill and developed from waterborne shipment data reported from other country-based foreign trade data sources. Over 1000 trade corridors are covered in this econometric model for forecasting ocean traffic across major international trade routes, by cargo type, type of service and size of shipment. Trade routes are projected by coastal, country or regional pairs of origins/destinations. Data are reported by total weight and number of container loads on waterborne shipments. The data do not report in transit shipments and only report the ports of lading or discharge as origins and destinations. Contacts can be made at: www.dri.mcgraw-hill.com.

Lloyd's Maritime Information Services, Inc.

Ship Movements Database is produced by Lloyd's Maritime Information Services, Inc and is available on line on a subscription basis. This database contains what appears to be the only single source of information on worldwide merchant ship movements. It includes daily updates on ship movement, gathered at principal ports worldwide, allowing determination of vessel service patterns in international waterborne routes, by arrival and departure dates. It does not allow cargo routing patterns to be precisely determined.

Maritime Research Inc.

A related source of the characteristics of a major segment of the supply chains is the **Chartering Annual**, produced by Maritime Research Inc. This publication, focusing on the shipping industry, presents yearly listings of charter fixture information (vessel, ownership, rate, lease/charter detail, etc.), including

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commodity, week and trade route. It is produced annually and the web sit is the following: <http://www.maritime-research.com/>

National Freight Movements

The public and private sources of data at the national level and from national sources are quite varied in coverage and detail. An examination of websites and studies using these data results in over 30 various sources, most of which are summarized below.

Public Data Sources for National Freight Movements

Agricultural Marketing Service, U.S.D.A.

The Agricultural Marketing Service (AMS) of the USDA produces the **Fresh Fruit and vegetable Shipments by Commodities, States, and Months** on an annual basis. Free of charge, the database reports seasonal movements in domestic, export and import volumes for fresh fruits and vegetables in the United States. Rail refrigerated and piggyback shipments as well as truck, air and boat shipments are in the database, by state or country of origin, weight and mode. These data are available on a state by state basis. Concerns about duplication of the intermodal shipments should be noted.

The AMS, USDA also generates a **Grain Transportation Report** which identifies volume of movements for domestic, export and total grain. Some routing information is available for ports and barge locks but no specific origin and destination pairs are offered. The three modes of truck, rail and waterway are covered throughout the United States on a weekly basis. This data set can be found at: <http://www.ams.usda.gov/tmdtsb/grain/>

Table 3: Public Sources for Information on National Freight Movements

Agency/ Organization	Data/Report	Information Description	Modes	Update Frequency	Format	Source
Agricultural Marketing Service of the USDA	Fresh Fruit and vegetable Shipments by Commodities, States, and Months	reports seasonal movements in domestic, export and import volumes for fresh fruits and vegetables in the U.S.	Barge, rail, air, truck, ocean	annually	monthly	http://www.ams.usda.gov/fv/mncls/shippsumm05.pdf
	Grain Transportation Report	identifies volume of movements for domestic, export and total grain	Barge, truck, rail, ocean	weekly	weekly	http://www.ams.usda.gov/tmdtsb/grain/
Bureau of Transportation Statistics	Display Tool CD	various components of the transportation network	Air, truck, barge, ocean, rail			
	National Transportation Statistics	statistics on the U.S. transportation system, including its physical components, safety record, economic performance, the human and natural environment, and national security		annually	annually	http://www.bts.gov/publications/national_transportation_statistics/
	Transportation Statistics Annual Report	review of the state of transportation statistics with recommendations for improvements and a presentation of the data		annually	annually	http://www.bts.gov/publications/transportation_statistics_annual_report/
Federal Aviation Administration	Air Passenger and All-Cargo Statistics	contains revenue passenger boarding and all-cargo data	Air	annually	monthly	http://www.faa.gov/airports_airtraffic/airports_planning_capacity/passenger_allcargo_stats/
	Airport Activity Statistics of Certificated Route Air Carriers	summary data for all scheduled and nonscheduled service by large certificated U.S. air carriers	Air	annually	selected monthly & quarterly	http://www.bts.gov/publications/airport
FHWA and the Office of the Secretary	GeoFreight: The Intermodal Freight	uses a routing model to assign data on freight flows to	Truck, Rail	once	once	https://www.bts.gov/pdc/user/products/src/products.xml?p=704
Federal Motor Carrier Safety Administration	Carrier Financial and Operating Statistics Information for Filers	collects balance sheet and income statement data along with information on tonnage, mileage, employees, transportation equipment and other related items.	Truck	annually	annually	http://www.fmcsa.dot.gov/reporting/mcs_info.htm
Oak Ridge National Laboratory	Freight Model Improvement Program	shares information on current and best practices in local freight data collection	Truck, rail, barge, ocean	varied	varied	https://www.fmip.gov/Home/tabid/36/Default.aspx

Table 3: - continued- Public Sources for Information on National Freight Movements

Agency/ Organization	Data/Report	Information Description	Modes	Update Frequency	Format	Source
Office of Airline Information, Bureau of Transportation Statistics	Air Carrier Statistics	contains domestic and international airline market and segment data	Air	monthly	monthly	http://www.transtats.bts.gov/Tables.asp?DB_ID=110&DB_Name=Air%20Carrier%20Statistics%20%28Form%2041%20Traffic%29&DB_Short_Name=Air%20Carriers
Office of Freight Management and Operations of the U.S. DOT	Freight Analysis Framework	designed to estimate commodity flows and related freight transportation activity every five years among states, sub-state regions, and major international gateways	Truck, air, ocean, rail	every five years	annually	http://ops.fhwa.dot.gov/freight/freight_analysis/faf/index.htm
Office of Highway Policy Info. of the USDOT	Highway Performance Monitoring System	data on the extent, condition, performance, use, and operating characteristics of the Nation's highways on an annual basis	Truck	annually	annually	http://www.fhwa.dot.gov/policy/ohpi/hpms/
U.S. Census Bureau	Annual Survey of Manufacturers	useful source of information on traffic and volume growth	Truck, rail, ocean, air, barge	annually	every five years	http://www.census.gov/mcd/asmhome.html
	Census of Manufactures	the major source of information about the structure and functioning of the manufacturing sector		every five years	every five years	http://www.census.gov/epcd/www/97EC31.HTM
	Commodity Flow Survey	a five year rotation, covering the industries of mining, manufacturing, wholesale trade and selected retail activities, in both national and metropolitan areas		every five years	every five years	http://www.census.gov/econ/www/cfsnew.html
	County Business Patterns	data for self-employed persons, employees of private households, railroad employees, agricultural production workers, and for most government agencies		annually	annually	http://www.census.gov/epcd/cbp/view/cbpview.html
	Truck Transportation, Messenger Services & Warehousing	operating revenue and operating revenue by source; percentage of motor carrier freight revenue by commodity type, weight of shipments handled, length of haul, and shipments country of origin and destination; and vehicle fleet inventory	Truck	every five years	annually	http://www.census.gov/svsd/www/sas48.html

Table 3: - continued- Public Sources for Information on National Freight Movements

Agency/ Organization	Data/Report	Information Description	Modes	Update Frequency	Format	Source
U.S. Census Bureau	Vehicle Inventory and Use Survey	data on the physical and operational characteristics of the nation's private and commercial truck population	Truck	every five years	every five years	http://www.census.gov/econ/www/viusmain.html
U.S. Corp of Engineers	Waterborne Commerce and Vessel Operators	data on barge and other vessel movements	Barge, ocean	annually	monthly	Http://www.iwr.usace.army.mil/ndc/prod.htm#NDC%20Data%20Bases
U.S. Department of Energy	Quarterly Coal Report	detailed quarterly summary statistics of coal production, distribution, trade, receipts, consumption and stocks	Rail, barge, ocean	quarterly	quarterly	http://www.eia.doe.gov/cneaf/coal/page/pubs.html
USDOT	Highway Statistics	data on the physical, operational, use, extent, and performance characteristics of public roads in the U.S.	Truck	annually	annually	http://www.fhwa.dot.gov/policy/ohpi/hss/index.htm
U.S. DOT's Surface Transportation Board	Rail Carload Waybill Sample	a stratified sample of carload waybills for terminated shipments by railroad carriers	Rail	annually	annually	https://www.stb.dot.gov/stb/industry/econ_waybill.html

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Bureau of Transportation Statistics

GeoFreight: The Intermodal Freight Display Tool CD is a new source of data and data structure produced by the U.S. DOT, Federal Highway Administration and the Office of the Secretary, Bureau of Transportation Statistics since December, 2003 and is available from

<https://www.bts.gov/pdc/user/products/src/products.xml?p=704>.

This 2-CD set presents a tool that uses a routing model to assign data on freight flows to various components of the transportation network. The tool uses existing data bases described in this report and is a prototype that serves two purposes: to graphically display geographic relationships between freight movements and infrastructure; and to assist freight policymakers and planners in identifying the flows of domestic and international freight across the nation and in assessing the current and potential major freight bottlenecks in the U.S. transportation system.

Transportation Statistics Annual Report (TSAR), produced by the Bureau of Transportation Statistics, U.S. Department of Transportation, is available at http://www.bts.gov/publications/transportation_statistics_annual_report/.

It is a congressionally mandated publication, providing a data overview of U.S. transportation issues. Each TSAR has two essential components: a review of the state of transportation statistics with recommendations for improvements and a presentation of the data. TSAR, first published in 1994, has been redesigned every few years. The most recent format was introduced with the TSAR published in October 2003. In this TSAR all transportation data and analysis are captured in one Indicators chapter with 15 topics. Most of these topics were specified in the Intermodal Surface Transportation Act of 1991, which originally authorized the Bureau of Transportation Statistics (BTS).

Underlying the above is **the National Transportation Statistics (NTS)**, produced by the Bureau of Transportation Statistics, U.S. Department of

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Transportation and available at

http://www.bts.gov/publications/national_transportation_statistics/.

NTS presents statistics on the U.S. transportation system, including its physical components, safety record, economic performance, the human and natural environment, and national security. This series is available to the public, is produced annually, but relies on other sources of data described in this report. No information is available on commodity shipments, flows and routing of traffic.

Federal Aviation Administration

The Federal Aviation Administration (FAA) of the USDOT produces **Airport Activity Statistics of Certificated Route Air Carriers**. This report is produced annually, with selected monthly and quarterly versions and is available at: [http://www.bts.gov/publications/airport activity statistics of certificated air carriers/2000/ndex.html](http://www.bts.gov/publications/airport_activity_statistics_of_certificated_route_air_carriers/2000/index.html). Data are reported by express and non express freight and mail. However, no in transit shipment data are available since only loading data are required in the Schedule T-3 reports to the FAA. Further, small certificated carriers or commuter airlines are not concluded.

Air Passenger and All-Cargo Statistics is produced by the Federal Aviation Administration and is available at [http://www.faa.gov/airports airtraffic/airports/planning_capacity/passenger allcar go_stats/](http://www.faa.gov/airports_airtraffic/airports/planning_capacity/passenger_allcargo_stats/).

Enplanement and cargo data are extracted from the Air Carrier Activity Information System (ACAIS), a database that contains revenue passenger boarding and all-cargo data. The database supports the FAA's Airport Improvement Program apportionment formula calculations. Passenger boarding and all-cargo data are collected for a full calendar year and determine entitlements for the next full fiscal year (i.e., calendar year 2003 data determines fiscal year 2005 entitlement funds).

Monthly data are reported by certificated U.S. and foreign air carriers on passengers, freight and mail transported. The series also includes aircraft type,

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service class, available capacity and seats, and aircraft hours ramp-to-ramp and airborne. These data are publicly available, usually on an annual basis.

A similar series of monthly data is collected as the **Air Carrier Statistics** by the Bureau of Transportation Statistics, and has been done so since 1990. It is available at:

http://www.transtats.bts.gov/Tables.asp?DB_ID=110&DB_Name=Air%20Carrier%20Statistics%20%28Form%2041%20Traffic%29&DB_Short_Name=Air%20Carriers. This Air Carrier Statistics database, also known as the T-100 data bank

contains domestic and international airline market and segment data. Certificated U.S. air carriers report monthly air carrier traffic information using Form T-100.

Foreign carriers having at least one point of service in the United States or one of its territories report monthly air carrier traffic information using Form T-100(f).

The four segments in this database respectively provide domestic market, domestic segment, international market, and international segment data.

This database is frequently used by the aviation industry, the press, and the legislature to produce reports and analyses on air traffic patterns, carrier market shares, as well as passenger, freight, and mail cargo flow within the aviation mode. The data is conducive to producing carrier load-factors, but does not contain carrier financial information.

The Large Air Carrier Statistics database, also known as the T-100 data bank and a subset of the above, contains domestic and international airline market and segment data. Large certificated U.S. air carriers report monthly air carrier traffic information using Form T-100. Foreign carriers having at least one point of service in the United States or one of its territories report monthly air carrier traffic information using Form T-100(f). The data are collected by the Office of Airline Information, Bureau of Transportation Statistics.

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Federal Motor Carrier Administration

The Federal Motor Carrier Safety Administration produces the **Carrier Financial and Operating Statistics Information for Filers**, publicly available at http://www.fmcsa.dot.gov/reporting/mcs_info.htm. Regulations require motor carriers of property with annual revenues of \$3 million or more to file annual reports, and carriers with annual revenues of \$10 million or more to file quarterly reports with BTS, as required by 49 CFR 1420, Reports of Motor Carriers. This program collects balance sheet and income statement data along with information on tonnage, mileage, employees, transportation equipment and other related items.

Oak Ridge National Research Laboratory

The Oak Ridge National Laboratory produces a **Freight Model Improvement Program (FMIP) Database**, which shares information on current and best practices in local freight data collection. It contains and summarizes information from other databases. It is not a new data generator but works on training and tools for analysis development, emphasizing local data collection and the use of those data. Existing data can be downloaded from <https://www.fmip.gov/Home/tabid/36/Default.aspx>.

U.S. Department of Transportation

Freight Analysis Framework (FAF), produced by the Office of Freight Management and Operations of the U.S. DOT, is designed to estimate commodity flows and related freight transportation activity every five years among states, sub-state regions, and major international gateways. The FAF also forecasts changes in those flows and activity based on shifts in economic conditions, availability of transportation facilities, and other factors.

FAF was designed as a policy analysis tool for the U.S. Department of Transportation. To make the FAF a more effective tool for measuring and analyzing the changing world of freight transportation FHWA is pursuing a three-

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pronged strategy that have implications for the data blueprint for the state of Washington.

First, FAF methods will be improved to provide a more accurate and timely characterization of freight flows through two major products:

- Origin-Destination Database of commodity flows among the 106 to 114 CFS regions plus major international gateways benchmarked every 5-years and updated annually with provisional estimates. The 2002 benchmark Origin-Destination Database will include forecasts every 5 years from 2010 to 2035; the 2007 benchmark Origin-Destination Database will include forecasts through 2040.
- Network Flow Database of commodity movements assigned to major transportation facilities, with forecasts and updates corresponding to the Origin-Destination Database.

Second, FAF data sources will be maintained and improved. Third, methods for using the FAF as a context for local issues will be developed through the Freight Model Improvement Program. Currently no information on specific origin and destinations by commodities, other than aggregate state and regional flows, is available. The Freight Model Improvement Program goes well beyond the FAF to enhance both the state of the art and the state of practice in freight modeling at the national, regional, and local scales. The program is targeted primarily on models for estimating and forecasting commodity flows and vehicle or vessel activity, and secondarily on models for turning flows and activity into safety exposure, environmental consequences, economic consequences, and other societal costs and benefits. The program also emphasizes improvements in local data collection to support freight models.

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Of use to this data study is the fact that the planned FAF improvements and the Freight Model Improvement Program are designed to improve the quality of published information, encourage development of local knowledge in lieu of dependence on default values from national surveys and overextended models, minimize competition with private vendors and dependence on proprietary data, and focus FHWA resources on improvements in the completeness and timeliness of the FAF and on the development of complementary analytical tools. The FAF will provide a framework--rather than become a substitute--for local data collection and analysis to support small-area planning and project design.

Detailed outputs from the FAF are available to all offices within DOT and to state and local entities, and include:

1. For each county of origin, estimates for 1998 and forecasts for 2010 and 2020 of the tons of freight moved in the United States by county of destination, type of commodity, and mode of transportation.
2. For shipments through a region or location, estimates for 1998 and forecasts for 2010 and 2020 of the tons of freight moved by county of origin, county of destination, type of commodity, and mode of transportation.
3. For segments on major highways, rail lines, and waterways, estimates for 1998 and forecasts for 2010 and 2020 of the tons of freight moved by county of origin, county of destination, and type of commodity; and for highway segments, the number of trucks.

Measures of the transportation system performance available from the FAF are limited primarily to truck vehicle miles of travel by highway level of service. Truck travel times can be imputed based on relationships between volume, capacity, and speed. Additional information needs are beyond the FAF's initial capabilities. Examples of such constraints include:

- estimates of commodity flows for geographic units smaller than counties;
- flows of commodities by local (intra-county) trucking;

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- flows of commodities by pipelines;
- origin-destination or network flows of commodities by hazard class;
- origin-destination or network flows that are less than three years old;
- updates of origin-destination and network flows;
- network flows by season or time of day;
- transportation costs;
- capacity constraints and performance indicators for rail and water facilities; and
- policy-sensitive mode split models and related analytical tools.

Local trucking is another major gap in the FAF. The FAF estimates intercounty movements of commodities by truck, but not intracounty movements.

A comprehensive catalog of commodity flows excluded from the FAF has not been compiled. Municipal solid waste, household goods movements, and other missing flows are not as large in the national picture as pipelines and local trucking, but may be locally significant and warrant local analysis in Washington as well as other states and regions.

The FAF converts commodity flows between places into commodity flows and vehicle activity over major segments and nodes of the transportation network. The transportation networks used in the FAF include most rail and water routes, the larger harbors and other major transfer points, and most major highways. The accuracy of estimated truck flows over the highway network depends on many factors and the FAF developers warn about these, among others, potential inadequacies.

- Estimates of individual county-to-county flows from nationally collected data are subject to significant error.
- The relationships between the geographical patterns of commodity flows and vehicle movements are not precise since trucks often pick up and drop off shipments as part of a tour or carry the shipment for only part of the way between the shipper and the consignee.

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Data Sources supporting the FAF are multiple and usually available from Federal government levels. They include, among others, the following, some of which are detailed later in this report:

Carload Waybill Sample

http://www.stb.dot.gov/stb/industry/econ_waybill.html

Domestic Waterborne Commerce of the United States

<http://www.iwr.usace.army.mil/ndc/wcsc/wcsc.htm>

Federal Energy Regulatory Commission Annual Report

http://www.ferc.gov/about/strat-docs/annual_rep.asp

Fisheries of the United States Annual Report

[http://www.st.nmfs.gov/st1/fus/current/2002-](http://www.st.nmfs.gov/st1/fus/current/2002-fus.pdf#search='Fisheries%20of%20the%20United%20States%20Annual%20Report%202002')

[fus.pdf#search='Fisheries%20of%20the%20United%20States%20Annual%20Report%202002'](http://www.st.nmfs.gov/st1/fus/current/2002-fus.pdf#search='Fisheries%20of%20the%20United%20States%20Annual%20Report%202002')

International Waterborne Commerce of the United States

<http://www.iwr.usace.army.mil/ndc/usforeign/index.htm>

Import and export data are found at:

<http://www.iwr.usace.army.mil/ndc/db/foreign/data/>

Municipal Solid Waste- BioCycle and Beck/Chartwell Studies

http://www.jgpress.com/archives/_free/000089.html

http://www.jgpress.com/archives/_free/000138.html

Municipal Solid Waste-Franklin/EPA Study

<http://www.epa.gov/epaoswer/non-hw/muncpl/pubs/msw2001.pdf>

Regional Elevator Survey: Grain Transportation and Industry Trends for Great Plains

Elevators

[http://www.ndsu.nodak.edu/ndsu/ugpti/DPpdf/DP143.pdf#search='north%20dako](http://www.ndsu.nodak.edu/ndsu/ugpti/DPpdf/DP143.pdf#search='north%20dakota%20regional%20elevator%20study')
[ta%20regional](http://www.ndsu.nodak.edu/ndsu/ugpti/DPpdf/DP143.pdf#search='north%20dakota%20regional%20elevator%20study')
[%20elevator%20study'](http://www.ndsu.nodak.edu/ndsu/ugpti/DPpdf/DP143.pdf#search='north%20dakota%20regional%20elevator%20study')

Transborder Surface Freight

<http://www.bts.gov/transborder/>

U.S. Air Freight Movements

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<http://www.transtats.bts.gov/>

U.S. Census Bureau-County Business Patterns 2002

<http://www.census.gov/epcd/cbp/view/cbpview.html>

U.S. Census Bureau-County Population Change

<http://www.census.gov/Press->

[Release/www/releases/archives/population/001758.html](http://www.census.gov/Press-Release/www/releases/archives/population/001758.html)

U.S. Census Bureau-County to County Migration Flow 2002

<http://www.census.gov/Press->

[Release/www/releases/archives/tip_sheets/001397.html](http://www.census.gov/Press-Release/www/releases/archives/tip_sheets/001397.html)

U.S. Commodity Flow Survey 2002

<http://www.census.gov/econ/www/cfs021200.pdf>

U.S. Department of Agriculture-Agricultural Statistics Annual Report

<http://www.usda.gov/nass/pubs/agstats.htm>

U.S. Department of Agriculture-Census of Agriculture 2002

<http://www.nass.usda.gov/census/>

U.S. Department of Energy-Energy Information Administration

<http://www.eia.doe.gov/emeu/aer/contents.html>

Vehicle Inventory and Use Survey

<http://www.census.gov/econ/www/viusmain.html>

The **Highway Performance Monitoring System (HPMS)** is a national level highway information system, publicly available and coordinated by the Office of Highway Policy Information of the U.S. DOT that includes data on the extent, condition, performance, use, and operating characteristics of the Nation's highways on an annual basis. It is available at

<http://www.fhwa.dot.gov/policy/ohpi/hpms/>. In general, the HPMS contains administrative and of system information on all public roads, while information on other characteristics is represented in HPMS as a mix of universe and sample data for arterial and collector functional systems. Limited information on travel and paved miles is included in summary form for the lowest functional systems.

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The HPMS was originally developed in 1978 as a continuing database to replace special biennial condition studies that had been conducted by the States since 1965. The HPMS has been modified several times since its inception, most recently in 1998; changes in coverage and detail have been made since 1978 to reflect changes in highway systems, legislation, and national priorities, to reflect new technology, and to consolidate or streamline reporting requirements.

The major purpose of the HPMS is to support a data driven decision process within FHWA, the USDOT, and the Congress. The HPMS data are used extensively in the analysis of highway system condition, performance, and investment needs that make up the biennial Condition and Performance Reports to Congress. These Reports are used by the Congress in establishing both authorization and appropriation legislation, activities that ultimately determine the scope and size of the Federal-aid Highway Program, and determine the level of Federal highway taxation.

These data are also used for assessing changes in highway system performance brought about by implementing funded highway system improvement programs and for apportioning Federal-aid Highway Funds to individual States under TEA-21. HPMS is a nationally unique source of highway system information that is made available to those in the transportation community for highway and transportation planning and other purposes through the annual Highway Statistics and other data dissemination media.

Individual State departments of transportation are responsible for the collection of data and reporting of these data to the FHWA headquarters through FHWA developed and maintained PC-based submittal software. While the FHWA receives, screens, organizes, and uses these data, these are still the State's data and the States are ultimately responsible for the quality of the data. The State departments of transportation are encouraged to cooperate with local

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governments and metropolitan planning organizations (MPOs) in the collection, assembling and reporting of the necessary information.

By June 1 of each year, the State must provide an annual Certification of Public Road Miles (23 CFR 460) signed by the current Governor or his/her designee. These data are used by the NHTSA to apportion highway safety funds to the States. By June 15th of each year, the State must report the HPMS data for the previous year to FHWA headquarters using the HPMS submittal software.

Highway Statistics is the baseline reference for much of the data collected by the U.S. DOT, and is publicly available at <http://www.fhwa.dot.gov/policy/ohpi/hss/index.htm>.

The section on roadway extent, characteristics and performance contains data on the physical, operational, use, extent, and performance characteristics of public roads in the United States. Public roads include those that are open to public travel and maintained by a public authority (see Code of Federal Regulations (23 CFR 460)). Other roads and trails that are privately owned or not publicly maintained or restricted from use by the general public are excluded. These data are derived from the Highway Performance Monitoring System (HPMS) described above.

The HPMS data, produced in Highway Statistics, is a combination of sample data on the condition, use, performance and physical characteristics of facilities functionally classified as arterials and collectors (except rural minor collectors) and system level data for all public roads within each State.

Nearly all tables in this section contain rural and urban stratifications; in some tables, urban may be further stratified into small urban (5,000 to 49,999 population) and urbanized (>50,000 population). An urbanized area is an area with 50,000 or more persons that encompasses at a minimum the land area delineated by the Bureau of the Census. The Bureau of the Census establishes

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urbanized area boundaries based on the density of population (persons per square mile). The adjusted Census urbanized area boundary reflected in this publication is usually enlarged to include such additional areas as airports, satellite cities/towns, strip developments adjacent to high-use roadways, and other areas and facilities that are important to or serve the urbanized area. In some cases, the adjusted urbanized area includes land that will become urban in some predetermined amount of time (such as 3 to 5 years). All adjusted boundaries are fixed by responsible State and local officials with the approval of the Federal Highway Administration.

About half of the States have adjusted the urbanized area boundaries based on the 2000 Census and the others are still based on the 1990 Census. In some areas, changes to the urban/urbanized boundaries are significant and these will affect the rural area data.

The tables in this section have been organized into nine general areas:

Public Road Length, Federal-Aid Highways National Highway System, Functional System, Urbanized Areas, State Highway Agency-Owned Public Roads, Highway Use and Performance, Motor Vehicle Fatalities and Metric Measurements.

Federal-aid highways are segments of State and local road systems eligible for Federal-aid construction and rehabilitation funds because of their service value and importance. Except for connectors on the National Highway System (NHS), roads that are functionally classified as rural minor collector or rural or urban local are excluded. The designation of a public road as a Federal-aid highway does not alter its ownership as a State or county road or city street. The Dwight D. Eisenhower National System of Interstate and Defense Highways were originally established by the Federal-Aid Highway Act of 1944. The Federal-Aid Highway Act of 1956 and the companion Highway Revenue Act of 1956 further defined the purpose and extent of the system and, as subsequently amended, dedicated several Federal excise taxes on motor fuel and automotive products to support Federal-aid highway activities. The Interstate System extends over

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46,000 miles (74,000 kilometers) and connects, as directly as practicable, the Nation's principal metropolitan areas, cities, and industrial centers; serves the National defense; and connects at suitable border points with routes of continental importance.

The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 eliminated the historic Federal-aid systems and created the National Highway System and other Federal-aid highway categories. The NHS was selected in consultation with appropriate State and local officials; it consists of the highway routes and connections to transportation facilities depicted on the maps submitted by the Secretary of Transportation to the Congress on May 24, 1996 and approved by the National Highway System Designation Act of 1995. Highways designated as part of the Interstate System are included in the NHS. Non-roadway routes, such as ferry boats, are not included in Highway Statistics.

The functional systems used in the reports and data bases result from the grouping of public roads according to the character of service they are intended to provide. Functional classification defines the role that a particular public road plays in serving the flow of trips through a highway network. The functional systems are: (1) arterial highways, which generally handle the long trips; (2) collector facilities, which collect and disperse traffic between the arterials and the lower level roads; and (3) local roads, streets, and other public ways, which serve a land access function to homes, businesses, individual farms and ranches, and other uses. Road length by functional system is identified by ownership, surface type, lane width, traffic lanes, access control, and traffic volume.

Information is also available on estimated lane length by functional system. FHWA assumes two through traffic lanes for the lane length estimate for rural minor collector and rural/urban local functional systems. Number of through

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traffic lanes as reported by the States is used to estimate lane length for all other functional systems for the NHS and Federal-aid highways.

The surface classification used in the data base identifies the pavement type used on the traveled portion of the roadway. Many highways, either by original design or because of reconstruction, consist of more than one major type of construction material. No data relative to vertical composition are presented, although material and layer thickness criteria are used to define the reporting categories.

Many other categories of data are available from this data source. Notable are volume-service flow ratios, urbanized area data, state highway agency data, highway use and performance data, serviceability, highway vehicle travel, among others.

In summary, The HPMS provides a generally uniform, consistent, statistically valid, and credible national level database built from State-provided data. The HPMS is the most comprehensive and accurate database available on the extent and performance of the Nation's highways. The HPMS data are to be used with full understanding of the data reporting and estimating processes and recognition of their strengths and weaknesses. When making State-to-State comparisons, the user must be aware of the differences that exist between the States being compared; it is inappropriate to use these statistics without recognizing, and accounting for, the major differences that may impact comparability.

The **Rail Carload Waybill Sample**, produced by the U.S. DOT's Surface Transportation Board every year is one of the most commonly used data sources and is available at https://www.stb.dot.gov/stb/industry/econ_waybill.html

The Carload Waybill Sample (Waybill Sample) is a stratified sample of carload waybills for terminated shipments by railroad carriers. Carriers may file waybill sample information by using either: (1) authenticated copies of a sample of

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audited revenue waybills (the manual system); or (2) a computer-generated sample containing specified information (the computerized system, or Machine Readable Input). Railroads terminating over 4,500 cars per year are required to file a sample of waybills with the STB.

The primary purpose of the Carload Waybill Sample is regulatory oversight. This database contains rail shipments data such as origin and destination points; type of commodity; number of cars, tons, revenue; length of haul; participating railroads; interchange locations; and Uniform Rail Costing System shipment variable cost estimates. The Waybill Sample contains confidential information and is used primarily by Federal and State agencies. It is not available for public use; however many Universities and researchers can get access to the database under conditions of confidentiality.

U.S. Census Bureau

The **Annual Survey of Manufacturers (ASM)** is a useful source of information on traffic and volume growth. It is produced by the U.S. Census yearly between the Economic Census and is available at:

<http://www.census.gov/mcd/asmhome.html>

The ASM provides sample estimates of statistics for all manufacturing establishments with one or more paid employee. The U.S. Census Bureau conducts the ASM in each of the 4 years between the economic census, which is collected for years ending in 2 and 7. The economic census - manufacturing is the sample frame from which the ASM is chosen and presents more detailed data than the ASM. Among the detailed data included in this survey are: employment, payroll, value added by manufacture, cost of materials consumed, value of shipments, detailed capital expenditures, supplemental labor costs, fuels and electric energy used, and inventories by stage of fabrication.

Census of Manufactures sometimes referred to as the manufacturing economic census can be found at <http://www.census.gov/epcd/www/97EC31.HTM>. The

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current manufacturing universe includes about 400,000 establishments. The population of manufacturing establishments has grown steadily from the 1963 population of 305,000.

The manufacturing economic census is the major source of information about the structure and functioning of the manufacturing sector. It provides basic information for government, business, industry, and the general public. The Census Bureau conducts the economic census every 5 years, covering years ending with a 2 or 7. The economic census furnishes an important part of the framework for such composite measures as the gross domestic product estimates, input/output measures, production and price indexes, and other statistical series that measure short-term changes in economic conditions.

The **Commodity Flow Survey (CFS)** is produced by the U.S. Census Bureau on a five year rotation, covering the industries of mining, manufacturing, wholesale trade and selected retail activities, in both national and metropolitan areas. Its aggregate website is: <http://www.census.gov/econ/www/cfsnew.html>

The 2002 Commodity Flow Survey (CFS) is undertaken through a partnership between the Bureau of the Census, U.S. Department of Commerce, and the Bureau of Transportation Statistics, U.S. Department of Transportation. This survey produces data on the movement of goods in the United States. The data from the CFS are used to assess the demand for transportation facilities and services, energy use, and safety risk and environmental concerns.

Users of the data base must be aware that, unfortunately, the survey coverage excludes establishments classified as farms, forestry, fisheries, governments, construction, transportation, foreign establishments, services, and most establishments in retail. The CFS captures data on shipments originating from selected types of business establishments located in the 50 states and the

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District of Columbia. Information is available about the respondent's establishment's shipments: domestic destination or port of exit, commodity, value, weight, mode(s) of transportation, the date on which the shipment was made, and an indication of whether the shipment was an export, or hazardous material. For shipments that include more than one commodity, respondents are instructed to report the commodity that makes up the greatest percentage of the shipment's weight. For exports, the foreign destination city and country is also available. Beginning with 1997, the survey was conducted every 5 years for years ending in "2" and "7." Commodity surveys were conducted between 1963 and 1983, but data for 1983 were not published. No data were collected for 1987. The survey and data for 2007 are being developed at this time.

The 2002 CFS consisted of a sample of 50,000 establishments chosen based on geographic location and industry. Information is available in printed reports and electronic form for the 1997 Commodity Flow Survey. The initial 2002 CFS report was released in December 2003, with more recent estimates now being available at the national level, for tons, miles, ton-miles and value by mode of transportation (including intermodal combinations), shipment distance, commodity, and weight.

Another public/national data source providing broad coverage of transportation related information is the **County Business Patterns (CBP)**, produced by the U.S. Census on an annual basis. It is a broad data set, covering all businesses, but significantly, does not include data for self-employed persons, employees of private households, railroad employees, agricultural production workers, and for most government agencies; thus, this limits its usefulness for developing freight transportation flows. It is available at <http://www.census.gov/epcd/cbp/view/cbpview.html>.

County Business Patterns is an annual series that provides sub national economic data by industry. The series is useful for studying the economic activity

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of small areas and the economics underlying the freight transportation flows; analyzing economic changes over time; and as a benchmark for statistical series, surveys, and databases between economic censuses. Businesses use the data for analyzing market potential, measuring the effectiveness of sales and advertising programs, setting sales quotas, and developing budgets. County Business Patterns covers most of the country's economic activity.

The **Truck Transportation, Messenger Services & Warehousing** is a data series developed and produced by the U.S. Census on a five year interval and is publicly available at <http://www.census.gov/svsd/www/sas48.html>.

The goal is to provide national estimates of revenue and vehicle fleet inventories for commercial motor freight transportation and public warehousing service industries. The United States Code, Title 13, authorizes this survey and provides for mandatory responses from companies with employment that provides commercial motor freight transportation and public warehousing services (NAICS 484, 492 and 493). Prior to 1999, the Service Annual Survey did not include transportation industries; they were surveyed separately as the Transportation Annual Survey.

Data collected include operating revenue and operating revenue by source; percentage of motor carrier freight revenue by commodity type, weight of shipments handled, length of haul, and shipments country of origin and destination; and vehicle fleet inventory. Current and previous year data are requested for the first year of a new sample. In subsequent years, only current year data are requested.

A popular and productive source of truck transportation flow and operational characteristics is the **Vehicle Inventory and Use Survey (VIUS)**, produced by the U.S. Census Bureau on a five year rotation and available at <http://www.census.gov/econ/www/viusmain.html>. The VIUS provides data on the

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physical and operational characteristics of the nation's private and commercial truck population. Its primary goal is to produce national and state-level estimates of the total number of trucks by covering all private and commercial trucks registered (or licensed) in the United States as of July 1 of the survey year. The survey excludes vehicles owned by federal, state, or local governments; ambulances; buses; motor homes; farm tractors; un-powered trailer units; and trucks reported to have been sold, junked, or wrecked prior to January 1 of the survey year.

VIUS data are of considerable value to government, business, academia, and the general public. Data on the number and types of vehicles and how they are used are important in studying the future growth of transportation and are needed in calculating fees and cost allocations among highway users. The data also are important in evaluating safety risks to highway travelers and in assessing the energy efficiency and environmental impact of the Nation's truck fleet.

Businesses and others make use of these data in conducting market studies and evaluating market strategies; assessing the utility and cost of certain types of equipment; calculating the longevity of products; determining fuel demands; and linking to, and better utilizing, other data sets representing limited segments of the truck population.

For a description of the sample design and the errors associated with such sampling the reader is directed to the website identified above. The recent sampling frame was constructed from files of truck registrations identified as being active as of July 1, 2002. The frame was stratified by geography and truck characteristics. The 50 states and the District of Columbia made up the 51 geographic strata. The sampling frame was partitioned into 255 geographic-by-truck strata. Within each stratum, a simple random sample of truck registrations was selected without replacement. This produced a total sample of approximately 136,000 truck registrations.

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There are two types of truck miles estimated as part of VIUS. Distributed truck miles estimates were computed by apportioning each truck's annual miles into the appropriate category based on the percent of miles driven in the category as reported by the respondent. Truck miles estimates presented in all other tables were computed by attributing 100 percent of an individual truck's annual miles to the category with the greatest reported percentage.

Estimates in published tables are based on data from the 2002 Vehicle Inventory and Use Survey and administrative records. To maintain confidentiality, no estimates are published that would disclose the operations of an individual truck. The total error of a published estimate may be considered to be comprised of sampling error and non-sampling error. Individuals who use the Vehicle Inventory and Use Survey estimates to create new estimates are required to cite the Census Bureau as the source of only the original estimates.

Nonsampling error encompasses all other factors that contribute to the total error of a sample survey estimate and may also occur in censuses. It is often helpful to think of nonsampling error as arising from deficiencies or mistakes at some point in the survey process. Nonsampling error can be attributed to many sources:

1. Inability to obtain information about all trucks in the sample,
2. Response errors,
3. Differences in the interpretation of the questions,
4. Mistakes in coding or keying the data obtained, and
5. Other errors of collection, response, coverage, and processing.

Additional statistics not shown in the tables are obtainable by tabulating records on a CD-ROM containing the survey micro-data. These additional estimates have not been included in the published reports because of high sampling variability, poor response, or other factors that may make them potentially misleading. It

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should be noted that some unpublished estimates can be derived directly from these reports by subtracting published estimates from their respective totals. However, the estimates obtained by such subtraction would be subject to the poor response rates or high sampling variability. Data users are cautioned to take into account the magnitude of "Not Reported" categories when assessing estimates computed using data contained in the CD-ROM. Individuals who use the CD-ROM micro-data to create estimates not published by the Census Bureau should cite the Census Bureau as the source of only the micro-data used, and not as the source of the new estimates.

U.S. Army Corp of Engineers

An ongoing source of data on barge and other vessel movements is the **Waterborne Commerce and Vessel Operators** series produced by the U.S. Corp of Engineers on an annual basis. This data series covers about all waterborne transportation and the waterway infrastructure. Regional Corps offices can provide origin and destination by port, lock, by commodity, by month and other relevant analyses. Other coverage includes shipment type, direction, draft, etc. Domestic waterborne shipment statistics are collected by the Corps from the Vessel Operations Reports. Foreign waterborne statistics are developed from the U.S. Bureau of the Census data source on waterborne general imports and exports of merchandise.

The public domain database is available in diskette or printed format for various state-to-state commodity origin-destination flows for \$5 per data file and \$15 per printed data source. Overall information on these data reported by the U.S. Army Corps of Engineers can be obtained from the following web site:

<http://www.iwr.usace.army.mil/ndc/prod.htm#NDC%20Data%20Bases>.

The database does not provide routing information for domestic state-to-state movements. Dock-to-dock shipments are only available on the Master Tape.

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U.S. Department of Energy

For freight information dealing with coal movements the **Quarterly Coal Report** is the basic source. The publishing organization is U.S. Department of Energy and the data are publicly available. It provides detailed quarterly summary statistics of coal production, distribution, trade, receipts, consumption and stocks. Specific information is available on BTU content, by origin, origin/destination flows, weight and routing (only by customs district for imports and exports) by all modes on a quarterly and an annual basis. The report is available at: <http://www.eia.doe.gov/cneaf/coal/page/pubs.html>.

Private Data Sources for National Freight Movements

American Association of Railroads

Freight Commodity Statistics, published annually by the American Association of Railroads, summarizes Class I railroad traffic by commodity (in many cases up to the 5-digit STCC level) for the Eastern and Western districts and for the United States as a whole. The source of the data are the quarterly and annual commodity statistics reports filed with the surface Transportation 'board by the Class I railroads. Publications of Freight Commodity Statistics are available 5-6 months after the end of each quarterly period for an annual cost of \$80 per annual publication.. Data include gross freight revenues; carloads and tonnage originated; carloads and tonnage terminated; and total carloads and tonnage carried. Freight movements are published as: freight originated and terminated, freight originated and delivered to another railroad, freight received and terminated, and freight received and delivered to another railroad.

The ONLINE DATA VERSION includes an Excel spreadsheet, and a pdf version of the Freight Commodity Statistics publication. It is available at <http://www.aar.org/pubstores/displayitem.aspx?id=14>. The series does not cover Class II and Class III railroads. Shipments are based on the location of the headquarters of the railroad, rather than origin and destination. Further, no information on origin-destination and routing by commodity is available.

Table 4: Private Sources for Information on National Freight Movements

Agency/ Organization	Data/Report	Information Description	Modes	Update Frequency	Format	Source
American Association of Railroads	Freight Commodity Statistics	summarizes Class I railroad traffic by commodity	Rail	annually	quarterly	http://www.aar.org/pubstores/displayitem.aspx?id=14
	North American Trucking Survey	sampling trucks that were selected on the basis of shipment length-of-haul at specific truck stop locations	Truck	stopped	one year	www.aar.org
	RR Industry Info* Railroads and States	Using data from other published sources it highlights the importance and performance of freight railroads by providing state-by-state statistics of the U.S. freight railroad industry	Rail	annually	annually	http://www.aar.org/AboutTheIndustry/StatelInformation.asp
American Trucking Association	a series of traffic movements and characteristics	issues and data on such variables as prices, routing, shipment characteristics, tonnage, regulation, politics, etc	Truck	varied	varied	http://www.truckline.com/index
DRI/McGraw-Hill	Freight Transportation and Logistics Service	historical data and a series of forecasts of spatial origin and destination by mode and commodity	Barge, truck, rail	not sure	not sure	www.dri.mcgraw-hill.com
ENO Transportation Foundation	Transportation in America	More than two dozen tables provide an overview of data on tonnage and passenger-miles by mode, public and private costs for transportation employment, fatality rates, petroleum demand, vehicle purchases, and more	Rail, truck, air, barge, ocean	annually	monthly	http://enotrans.com/store//page2.html
Global Insight	Freight Locator	identifies who are shipping goods and what commodities are being shipped	Rail, truck, air, barge, ocean	annually	annually	http://www.globalinsight.com/ProductsServices/ProductDetail1024.htm
	TRANSEARCH Insight and Freight Locator	county-level freight movement data by commodity group and mode of transportation		annually	annually	http://www.globalinsight.com/ProductsServices/ProductDetail700.htm
	U.S. Intermodal Freight Flow	projects freight flows by truck, air, rail, and water for all 3,000+ U.S. counties		twice a year	annually	http://www.globalinsight.com/ProductsServices/ProductDetail1024.htm
Institute of Transportation Engineers	ITE Trip Generation, accompanied by the Trip Generation Handbook	handbook and data series provide guidelines for application and interpretation of trip generation data	Truck	none	none	http://www.ite.org/tripgen/trippubs.asp
Intermodal Association of North America	Intermodal Market Trends and Statistics	quarterly report of industry statistics, and attempts to provide an in-depth look at intermodal industry data	Truck, rail	quarterly	quarterly	http://www.intermodal.org/pubs.html#MT&S

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The **North American Trucking Survey (NATS)** is also provided by the Association of American Railroads and is available at www.aar.org. These data were collected in 1993-94 and a report generated in 1997, by sampling trucks that were selected on the basis of shipment length-of-haul at specific truck stop locations. The sampled truck drivers were interviewed to obtain information on the commodity/shipment, O-D data, the operator and the annual vehicle miles traveled by the drivers. No updated surveys are available.

The American Association of Railroads produces a publication, **RR Industry Info* Railroads and States**, on a yearly basis. Using data from other published sources it highlights the importance and performance of freight railroads by providing state-by-state statistics of the U.S. freight railroad industry. Summary statistics include number of miles, number of employees, carloads/tons carried, number of railroads and the total wages earned.

American Trucking Association

On a subscription basis only, a series of traffic movements and characteristics is available from LTL (Less-than-truckload) Commodity and Market **Flow**. More information is available from <http://www.truckline.com/index> in the form of data files and printed reports. It is published by the American Trucking Association (ATA) and covers issues and data on such variables as prices, routing, shipment characteristics, tonnage, regulation, politics, etc. It covers metropolitan, state and national flows and issues.

DRI/McGraw-Hill Inc.

Freight Transportation and Logistics Service (FTLS) is a for-fee database produced by DRI/McGraw-Hill that reports historical data and a series of forecasts of spatial origin and destination by mode and commodity. Some data on operating costs of shipments by mode is available for purchase, some pricing information is available and an overall demand for transportation is generated. Cargo tonnage is reported by mode and equipment type.

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The data sets remain proprietary so no corroboration of the data projections with other data sources is possible. The data series also does not provide commodity by routing or specific origin/destination pairs.

Eno Transportation Foundation

Transportation in America, is published by the ENO Transportation Foundation, and is available at <http://enotrans.com/store//page2.html> .

More than two dozen tables provide an overview of data on tonnage and passenger-miles by mode, public and private costs for transportation employment, fatality rates, petroleum demand, vehicle purchases, and more. All data, though, generally covers only national trends and these data all come from other sources cited in this review.

Global Insight

A proprietary source of information widely used (estimates are that up to 40% of state DOTs rely on it) is the **TRANSEARCH Insight and Freight Locator**, found at: <http://www.globalinsight.com/ProductsServices/ProductDetail700.htm>.

The publisher/owner is Global Insight. The TRANSEARCH INSIGHT database is a subscription only source for U.S. county-level freight movement data by commodity group and mode of transportation. This database combines information from public sources and data on primary shipments obtained from major freight carriers. It provides detailed U.S. and cross-border origin and destination freight shipment at the state, BEA, county, metropolitan area and Zip code level by commodity type and mode of transportation.

With the recent acquisition of Reebie Associates, this database has been extended to include projections consistent with Global Insight's macro forecasts. Service Features include the following:

- Truck shipments of manufactured goods and selected non-manufactured goods

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- Rail shipments, including carload and intermodal
- Waterborne and air freight shipments
- U.S./Mexico and U.S./Canada shipments for selected transportation modes

Global Insight's **Freight Locator** is a companion to the TRANSEARCH INSIGHT data service, adding specific facilities to the freight shipment information TRANSEARCH INSIGHT provides. Containing more than 168,000 records on U.S. manufacturing and warehousing establishments, Freight Locator identifies who are shipping goods and what commodities are being shipped. This series also provides estimates of annual tonnage, equipment needs, and rates of business growth or contraction.

As an extension of the historical TRANSEARCH® database, Global Insight's **U.S. Intermodal Freight Flow** database projects freight flows by truck, air, rail, and water for all 3,000+ U.S. counties. Twice a year, Global Insight provides detailed annual data for 38 different commodity groups. This database links freight forecasts with detailed economic activity from Global Insight's Business Demographic database.

The accuracy of the data produced by these efforts is dependent to a large degree on the accuracy of the multiple and varying sources of those data. Sampling frames and statistical coverage or bias is not always reported.

Institute of Transportation Engineers

A series of data produced by the Institute of Transportation Engineers is the **ITE Trip Generation**, accompanied by the **Trip Generation Handbook**, available at <http://www.ite.org/tripgen/trippubs.asp>. This recommended practice handbook and data series provide guidelines for application and interpretation of trip generation data. Topics covered in the handbook and data series include guidelines for estimating site trip generation, collecting local trip generation data,

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developing local trip generation rates, estimating pass-by trips and estimating trip generation for multiuse land developments. Informational pieces also are provided on truck trip generation, the effects of travel demand management (TDM) and transit on trip generation and a summary of literature on multiuse developments.

The seventh edition of Trip Generation includes numerous updates to the statistics and plots published in earlier editions. A significant amount of new data has been collected and several new land uses have been added. Data from more than 500 new studies have been added to the existing database for a combined total of more than 4,250 individual trip generation studies. New land uses include: assisted living; continuing care retirement community; batting cages; adult cabaret; multiplex movie theater; soccer fields; athletic club; private school (kindergarten to grade 8); baby superstore; pet supply superstore; office supply superstore; book superstore; discount home furnishing superstore; arts and craft store; automobile parts and service center; and automated car wash.

The Handbook incorporates changes necessary for consistency with the data contained in the Seventh Edition of Trip Generation, which was released in November 2003. Additional data have been added to Chapter 5, Pass-By, Diverted and Linked Trips. All other changes were strictly editorial updates to the material contained in the 2001 handbook.

Intermodal Association of North America

Intermodal Market Trends and Statistics (IMC) is produced by the Intermodal Association of North America and is available at:

<http://www.intermodal.org/pubs.html#MT&S>. It is a quarterly report of industry statistics, and attempts to provide an in-depth look at intermodal industry data. IMC statistics include intermodal volume, highway truckload volume, total loads, intermodal revenue, and highway revenue. Comparisons of prior quarter and prior year activities are measured, as well as current year to date activity. Trends for activities over the prior 18 months are also illustrated. Rail statistics include

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movements by equipment size, key corridor activity, and traffic flows between regions, including Canada and Mexico.

State Freight Movements

Data sources at the state level are predominately public sources and include continuing traffic counts on state highways, metro areas and many other locations, as well as individual traffic counts for specific projects and policy needs. The following are selected examples of state and some local data generation efforts.

Public Data Sources for State Freight Movements

Intelligent Transportation System Research Program, University of Washington

The ITS Research Program at the University of Washington developed the **Traffic Data Acquisition and Distribution (TDAD)**, available at <http://www.its.washington.edu/tdad/>.

The TDAD project is more versatile than the larger data bases because it provides data for anytime and location, and for any length of time interval. The goal of the TDAD project was to supply traffic data for a wide area, such as King County in Seattle, Washington, over long periods of time to enable various traffic agencies to perform research activities. It can be queried for differing locations, coverages, and traffic characteristics.

Washington State Department of Transportation

The heart of the data collection in the State of Washington is the Transportation Data Office (TDO) of the WSDOT. TDO collects and manages statewide traffic, roadway and collision data for many differing clientele. Various categories of data compiled and managed include many aspects of collisions, various aspects of highway descriptive and performance data, traffic data dealing with collection

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of data and operational aspects of the highway elements, travel data of numerous aspects and also technical support of analysis and planning with data.

The Washington State Department of Transportation has developed the WSDOT **GeoData**, available at

<http://www.wsdot.wa.gov/mapsdata/GeoDataCatalog/default.htm#links>.

The WSDOT GeoData **Distribution Catalog**, maintained by the Office of Information Technology, is a centralized distribution site for sharing; therefore, data on this site are available for download free-of-charge. The data are provided in [ESRI](#) shapefiles, georeferenced .jpg, and [Mr. SID](#) formats. If the user does not have a GIS solution to view this data, they can download free of charge open source software for Windows, Macintosh, or Linux from [Quantum GIS \(Qgis\)](#) or [Refractions Research \(uDig\)](#). Data provided are used by WSDOT's transportation partners, government entities, schools, private businesses, researchers and the general public. .

The use of GIS allows a geospatial framework to be used in presenting the data and conducting analysis. It is the largest and most useful of the data bases in the State of Washington, mainly since it operates as a catalog or repository for many other data sets.

The **Long –Term Air Transportation Study (LATS)** for the State of Washington was signed into law in 2005. It authorized a long-term air transportation planning study for general aviation and commercial airports statewide. The purpose of LATS is to understand what capacity currently exists in aviation facilities and what will be needed to meet future demand for air transportation. The bill requires WSDOT Aviation to conduct an airport capacity/facility assessment in Phase One and a demand/market analysis in Phase two. In the final phase the Governor will appoint a 10 member aviation planning council. The council will review the data and make recommendations to the Governor, Legislature, and Transportation Commission on how to best meet statewide commercial and

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general aviation capacity needs. The Governor's aviation planning council is being developed as of May, 2007. The first two phases are expected to produce data and data analysis on the overall needs of the aviation industry in the state of Washington.

WSDOT produces the **Freight and Goods Transportation System (FGTS)**, which ranks roads in the State by average gross annual truck tonnage moved on each stretch. This is not new data but is a configuration of data presented in other sources in this review. The designation of the system is revised annually by the local agencies assigned responsibility over each road segment. The FGTS identifies the routes most heavily used by trucks and provides data that are used to support funding for project that improve conditions for freight transportation, supporting pavement upgrades, traffic congestion management and other investment decisions. It is available at the WSDOT web site.

Other sources of data exist within any state, such as Washington. WIM sites, short term vehicle counts (ATR), and other traffic counting locations provide the base data for the GeoData extensive data base of the WSDOT. Many port/harbor studies are available from the Public Ports Association and individual ports. Many of these include projections by commodity, region and destination for varying timeframes. Metropolitan Planning Organizations (MPOs), such as PSRC, IMTC and SWEST/VANCOUVER, etc. often participate in and produce regional specific, but data driven, analyses that are easily available at their websites. In a similar fashion, Regional Transportation Planning Organizations (RTPOs) conduct freight movement studies in their respective areas that do generate some primary data but often rely on the data sources mentioned above. Many of these studies are available in the WSDOT's **Planning Studies List and the Statewide Map of Studies**, which identify the location and sponsor of each study. Other metro and county entities are also continually producing small studies with data sets generated only for the purpose of the individual study.

Table 5: Public Sources for Information on State Freight Movements

Agency/ Organization	Data/Report	Information Description	Modes	Update Frequency	Format	Source
ITS Research Program at UW	Traffic Data Acquisition and Distribution	provides data for anytime and location, and for any length of time interval	Truck	twenty seconds	daily	http://www.its.washington.edu/tdad/
Office of Information Technology of WSDOT	WSDOT GeoData	numerous but mainly are based on traffic counters of various types	Truck, rail, barge	daily, weekly, monthly, annual	daily, weekly, monthly, annual	http://www.wsdot.wa.gov/mapsdata/GeoDataCatalog/default.htm#links
Washington State Transportation Center	TRAC Truck Data	provides specific site statistics, segment statistics, data summaries (both predefined and custom) and site comparisons	Truck	varied	varied	http://trac24.trac.washington.edu/trucks/index.jsp
Washington State University	Strategic Freight Transportation Analysis	many faceted study of freight movement in and around the state of Washington	Truck, rail, barge	varied	varied	http://sfta.wsu.edu
WSDOT	Washington Transportation Plan Data Library	source focuses on the data and studies that were reviewed and used in the development of the State Transportation Plan and policy decisions within the state	Rail, air, truck, barge, ocean	varied	varied	http://www.wsdot.wa.gov/planning/wtp/dataLibrary/
	Weigh in Motion (WIM)	permanent traffic reporting	Truck	continuous	daily	http://www.wsdot.wa.gov/mapsdata/TDO/electronics.htm
	Freight and Goods Transportation System	ranks roads in the State by average gross annual truck tonnage moved on each stretch	Truck	annually	annually	http://www.wsdot.wa.gov/planning/FreightGoodsTransportation.htm
	Long –Term Air Transportation Study	understand what capacity currently exists in aviation facilities and what will be needed to meet future demand for air transportation	Air	not published	not published	http://www.wsdot.wa.gov/aviation/LATS.htm
	Tribal Transportation Database Project	documents road characteristics such as physical features, average annual daily traffic, etc	Truck	varied	varied	http://www.wsdot.wa.gov/planning/Tribal/

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These are available and can be useful to a certain degree, though corroboration of these data with other sources is critical.

A data source that is increasing in usage is the **Washington Transportation Plan Data Library**, compiled by the WSDOT. This source focuses on the data and studies that were reviewed and used in the development of the State Transportation Plan and policy decisions within the state. A recently developed highway data source is the **Tribal Transportation Database Project (TTDP)**, initiated by WSDOT in conjunction with the Tribal Transportation Planning Organization (TTPO), which documents road characteristics such as physical features, average annual daily traffic, etc. It presents the data by county, BIA or tribal ownership and inventories the current conditions and future needs of this Tribal road system.

Washington State Transportation Center

Closely related to the above is the **TRAC Truck Data**, available at <http://trac24.trac.washington.edu/trucks/index.jsp>. This data series again uses truck counts to provide a basic analytical package. It provides specific site statistics, segment statistics, data summaries (both predefined and custom) and site comparisons.

Washington State University, Strategic Freight Transportation Analysis

The **Strategic Freight Transportation Analysis (SFTA)** is a multi-modal study of freight movements in and around the state of Washington. Connected to its predecessor, the Eastern Washington Intermodal Transportation Study (EWITS), SFTA has produced multiple product, mode, commodity and supply chain studies. Most of the major industries in the state of Washington have been surveyed over the past five to ten years under this research effort. Studies recently completed include warehouse/distribution centers, mining and mineral and agricultural commodities. Two specific studies offer information for data generation in the state.

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First, a statewide truck origin and destination study was done under both EWITS and SFTA, allowing a time trend on truck movements and characteristics to be developed. These reports present the findings of an extensive yearlong survey assessment of freight truck movements on highways in the state of Washington. This study follows up on the Eastern Washington Intermodal Transportation Study (EWITS) completed in 1993-1994 and is analogous in scope to EWITS Research Report Number 9 (Nov. 1995). The SFTA study involved almost three hundred individuals who conducted personal interviews with truck drivers at 28 separate survey locations around the state. This state-wide origin and destination survey obtained approximately 24,000 observations, providing the state of Washington and Strategic Freight Transportation Analysis (SFTA) project researchers an updated, extensive database with which to examine statewide freight movements.

Documenting the geographic movement of freight truck shipments between individual cities and regions within the state of Washington is a key component of SFTA. Geographic coordinates (geo-codes) were developed for each Washington origin and destination identified by truck drivers participating in the origin-destination study. This process was performed within the Geographic Information System (GIS) software: ArcInfo. Utilizing an Arc Macro Language program, a list of five potential routes was developed for each origin-destination pair. The route that most closely matched the highway usage provided by the survey respondent was selected and assigned to each respective survey observation. The assignment of the truck origin-destination data to geographic coordinates allows for very detailed and accurate analysis between any attributes from the survey data (truck configuration, commodity, weight, base of operation, origin, destination, facility type, etc.) to anything that has a geographical property (highway, land, people, socio-economic data, etc.)

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Summary

The above inventory of data sources reveals multiple sources with multiple approaches to data sourcing and presentation. Blending these disparate sources into a data framework, one that reflects the needs of the users and the gaps between the user needs and existing data will allow development of an action plan for the State of Washington as it searches to provide the data necessary for productive decision making at all levels of government and in the private sector.

Chapter II: Survey of Other State Department's of Transportation Freight Data Usage and Application

This second chapter of the interim report provides information on and from State DOTs as to how transportation data are used in their state and what data are currently being used. Chapter three looks at the needs for improved or more applicable data as identified by the State DOTs.

The general source for this chapter is a series of telephone interviews with selected State DOTs, requesting information as to what data are used, what issues are arising that require new or more complete data and what are those data needs for the states. In addition, previous studies detailing freight data usage and concerns are used as sources, as were other conference proceedings, reports/literature and popular articles dealing with the freight data issues in the states. Information developed for this report, from all three sources, covered a broad spectrum of states, some heavily agricultural and resource based, some quite urban in character, some very trade oriented for both import and export movement and some with the split of population/urban character and economic activity as evidenced, for example, by the State of Washington and the

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State of New York. The states providing information to interviews or to reports were:

- Alaska
- California
- Colorado
- Florida
- Georgia
- Idaho
- Kentucky
- Minnesota
- North Dakota
- New York
- Ohio
- Oregon
- Pennsylvania
- South Dakota
- Wisconsin

The condition of freight data for improved transportation decision making at all levels has received significant attention over recent years. This is evident in the literature reviewed for the data sources identified in Chapter 1 and also in the responses of states to questions regarding overall data availability and usage. This interest is based on the changing nature of the transportation and logistics issues affecting State DOTs, especially the global economic situation, with its competition, partnerships and shifting landscapes of both. Thus, Transportation Research Board activities have spent more and more time trying to tie the international, national, regional and local transportation interests into the global or larger picture, and do it so State DOTs will have the perspective and capability to link all levels of interests into their planning and service provision.

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A good example is the Peer Exchange conducted by the TRB and reported in Circular E-C080 as it attempted to identify the freight data current situation for state transportation agencies. This effort was preceded by other TRB committee aided efforts as well, including Data Needs in the Changing World of Logistics and Freight Transportation, a conference held in New York and a review/workshop report discussing the issues and option for future enhancements of one particular freight data source, the Freight Analysis Framework (FAF), produced by the Federal Highway Administration. These and similar efforts resulted in a Concept for a National Freight Data Program, also prepared by the Committee on Freight Transportation Data, designed to recommend a framework for the development of national freight data. This framework, focused at the national level articulates the types of freight data needed by the variety of users in transportation and the roles of different data providers.

Of particular note is the recent Data Requirements in Transportation Reauthorization Legislation conference organized by the TRB. Its focus was to identify the data issues associated with the program proposals in the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). The analysis of the challenges and data requirements for this authorization legislation, and the strategies offered to fulfill those requirements, can be useful to states as they work with the new focus relative to the needs of their states; but as identified by states, there are burdens that come with these activities, burdens that are both financially and data intensive. Various states mentioned these above activities as having guided their thinking as they sought to improve the availability and applicability of data for their planning and investment purposes.

A similar activity, undertaken by NORPAC, A regional center for freight mobility comprised of Washington and North Dakota Universities, emphasized the issues and data needs from a regional, rather than a local or state perspective. Again,

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state interests within the regional context are identified, providing some value to State DOTs in their policy and program deliberations.

How freight transportation data are used in the states and what data are used does vary somewhat from state to state. Current usage of data was often broken down by many of the states into policy, planning and project usage, with the line between the usages sometimes being very thin.

Policy Applications

Policy formation occurs at both the state and national level. State DOTs emphasized that they consider themselves the implementers of state policy, as developed by the appropriate decision makers, usually the Governor and the Legislature. However, they also understand their persuasive role as analysts and evaluators of the impacts and results of alternative policies relative to the identified goals of the decision makers. They also feel they provide a similar service to the state policy makers as when the state position towards alternative national policies is developed. Much of the data discussed in this report are utilized in these policy development processes at both the state and national levels, and in some circumstances, at local and regional policy deliberations as well.

Transportation data provide insights for the state agencies into policy issues such as the impact of rail line abandonment and overall loss of rail infrastructure. Truck and rail volume counts, classification and weight, flow data, pricing data and road damage/management data were commonly in the development of state positions on ownership/investment/partnerships with railroads or port entities. Availability and accuracy of these data was of concern to several of the states.

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Congestion, capacity, chokepoints and associated declining service levels and safety considerations were common foci, and studies and data sets were developed to analyze these issues, particularly seeking to quantify the contribution of trucks to the issue. Traffic flows by hour, location and density, and the performance measures of drive time, accidents, etc. were analytical data useful in the studies.

Underlying these analyses were attempts by some states to quantify the cost of congestion, cost to the trucking and passenger sectors as well as cost to the economy of the delays. Corridor studies and analyses, as baseline knowledge bases, were common usages of data. Such studies do position the state and local/MPO analysts to have a readily available set of data with which to work. Concerns of availability and cost of those data were mentioned.

Truck size and weight issues were commonly tasked to the State DOTs for analysis, sometimes along with the enforcement of attendant rules and regulations. Data on loads, weights and general flows of trucks are accumulated by weigh stations and WIM sites in most states, though the number of locations does seem to vary heavily. These data inform the state for its own decisions but also serve to prepare the state to enter into the national and regional debate about length and weight issues.

Truck cost allocation studies by the states also were dependent on data that is usually available. Resultant cost allocations are often challenged by special interests, as reported by some states, and definite data on road usage relative to registration and licensing revenue is critical and is often used for analysis and defense of decisions.

A consistent use of data by the states was to identify current traffic flows and project the composition and magnitude of such flows into the future to support the policies as they are developed by the states. Several states had used limited

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origin-destination studies to provide the composition and characteristics of industries necessary to make those future projections. Such use seemed to be invaluable but sporadic and expensive. These origin and destination data series, or at least data bases, were of more interest for those port or border states than for inland states that seemed to emphasize through or transit movements in there data usage.

Some of the data series identified in chapter 1 of this report were used, to the degree possible, in multi-state analysis and coordination, particularly on major interstate corridors. Such analyses were used to develop state coordination regional policies on capital investment in a system fashion, where state borders were ignored and the focus was on the passenger or freight movement. Data from differing states, which was noted to sometimes come in different forms and formats, are combined in attempts to do full origin-destination flows in each corridor of interest.

An emerging area of data usage is the issue of toll roads, congestion pricing and related traffic management/revenue enhancement schemes in various states. Traffic count data are used to provide the benchmark for analysis of proposed fee structures, with other data having to be generated specific to each study to ascertain carrier response to the alternative levels. These latter data have to be discovered on a case by case basis, often with attendant expenses. Policies dealing with toll roads are being developed by many states, as revenue for even basic maintenance is falling short of required levels.

Most states find they are tasked with modal studies and evaluation, from air to rail to truck to water as states develop policies related to individual modes within their state. Data usage by states dealing with these studies is usually derived from national data and or mode association reports. The broad data sets identified in chapter 1 dealing with air, rail and water are most commonly used by the states in these analyses and reports. This is one area specifically those

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states did report using the data of private consultants to formulate general flows and trends in those flows; those data sources are also identified in chapter 1 as private, for-fee sources.

A relatively new area of data usage was examination of security risks, whether catastrophe, terrorism, hazardous materials sources. Data on traffic flows over bridges and road sections, alternatives to those corridors, seasonality and timing during the days of movements are being combined with hazardous material identifiers and used to determine exposure and diminish uncertainty wherever it is possible. This is of common usage, especially in the port and Border States, where origin and destination data, from whatever possible source, are being pieced together to understand movements and vulnerability.

Planning Purposes

Planning for most of the states involved multiple activities, levels and varying goals. Requisite plans for federal requirements were heavy users of traffic count data but also used local and regional data for benchmarking of the plans, whether for state needs or participation in federal funding/planning. Freight data were used in MPO regional planning studies and related transportation studies as well as the District/regional plans within the DOTs. Some of these plans were heavy users of the traffic count data, in time and space, as in the mobility plans of the state and regions within the states. States recounted numerous times of providing traffic and trade data to economic development entities as they were involved in economic development planning; such entities range from RTPOs to MPOs to urban development groups such as Chambers of Commerce, Port Districts or Public Utility Districts. These data do, to some degree, provide information at to the impact of such growing traffic on the highway system in areas of congestion and safety.

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Port master plans relied on surrounding traffic flows, congestion, delay time and other volume related performance information, some of which is provided by the State DOTs. In particular, data describing and explaining the performance of intermodal connectors which support the traffic movement out of the ports are heavily used by the ports. Underlying port master plans, and in fact most plans, is an increasing use of any available data to provide supply chain, industry and commodity flow and distribution center analyses. State DOTs seem to have come to the realization that examination of supply chains, as one integrated unit, results in better decisions making and understanding of problems and alternative solutions than segmented analysis, even though available data may not be sufficient at this time to fully address such chains. Several states have had University researchers conduct industry supply chain studies on a one time basis to get at least a snapshot of the entire supply chain.

A related analytical use of the data by the states is the development of performance goals, performance norms and benchmarks for the plans, as they are developed, to be able to judge progress. Such data usage results in the State DOTs being able to undertake special studies for executive management or respond to legislative requests. Similarly, even at the project level, plans must be developed and transportation data are the foundation upon which these projects are ranked, implemented and evaluated. Data usage is both broad and deep in these areas.

In the long term context, freight transportation data are used to undertake long term capital planning and investment by the states, including the prioritization of projects and capital expenditures. The data form the base from which emerging issues, issues such as the new Federal security mandates or the growing number of ethanol/bio-diesel plants as they dramatically change freight flows can be analyzed. Further, the data, again to the limited extent available, allow planning for small urban areas as to traffic patterns, growth structure and development pace to proceed.

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Project Purposes

At the heart of every Highway or Transportation Department are the construction projects, whether new capacity or maintenance/restoration/preservation. Every project evaluation and later construction relies on traffic flow data, current and projected, to determine the timing of the project relative to other projects in the existing budget, the design of the project and the ultimate costing of the project. Bids are determined and evaluated within the context of the data driven magnitude of the project. Every State DOT reviewed in this survey commented in some fashion that construction and operations costs were the most basic information and ,were the most critical for day to day service provision and these projects that provided that service. Certified traffic flows are necessary to value engineer design and build efforts.

In a broader context, all projects have impacts outside of each stretch of pavement or bridge. For example, they can be used to foster or support development of intermodal/multimodal facilities that are cost efficient system wide. Several states commented that these broader data were used in this fashion but were often sparse or lacked continuity among sources. They felt that available knowledge about freight traffic generators was being used but was not specific in nature as to route utilized, timing of shipments and alternative pricing or efficiency of routing.

Summary of State Departments of Transportation Data Needs

This chapter summarized how State DOTs utilized the data sources identified in chapter 2 earlier. Much of the active usage was at the planning and policy level where freight transportation data allowed and improved decisions, both current and future. But, data on project evaluations were critical in the short run and formed the majority of near term data usage. These data used at the project level, however, are often used at all three levels and require attention of the data

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masters and researchers for that reason. The chapter focused on actual usage of the data but of necessity commented on potential failings of the data available to, and as reported by, those decision makers. The next chapter looks to the data needs identified by the states in the literature and survey, both at to data type and to questions desired to be answered by these data.

State DOTs were explicit that a new emerging need for correct and defensible data was due to the new higher profile of freight at the executive administration level, and the development of freight policies, program management and intermodal choices at that level. This emerging global need results in data needs at every level and from every source possible to inform the policy discussions. In this chapter the issues as identified by the states, arising or current or recurrent, that cause needs for data are reviewed and analyzed. Then the needs themselves will be summarized from the states' perspective, and finally any perceived limitations to the data as they currently exist will be inventoried.

Issues

Issues increasing or reinforcing the need for improved freight transportation data are both new and recurrent. A continuing need is for data that can inform the long term capital planning and investment process by the states. This need is enhanced by the growing truck traffic on the highway system creating congestion/safety concerns, traffic that is expected by some to double by 2020, during a time period of funding shortfalls and revenue flattening.

Several specific issues were common among many of the states. A need for origin-destination information on freight traffic generators within the states was paramount; yet there appears to be a need for further development of east-west, or at least long haul, intermodal/multimodal rail loading facilities, facilities that could carry traffic off the road in a cost competitive position. These needs are complicated by concerns about the loss of rail lines through abandonment of

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branch lines or closure of short line railroads. These issues were, in some states, specifically related to the increase in number of ethanol/bio-diesel plants, plants that are dramatically changing or increasing freight flows.

Related issues were concerns about the truck size/weight disparities across the states and the impact on efficiencies of overall movement, as well as fuel costs and hours of service specific to the trucking firm's operations.

Specific questions that came up from the State DOTs, not necessarily as issues, were related to whether freight corridors can handle the projected traffic levels safely and efficiently. To answer that question information on the identification of exact commodities/goods moving across state highways and better understanding of private sector logistics operation was desired. Associated with that question is, "what is the impact on planning by the state of answers to these questions?" Specific questions on freight movements in sub-regions of the states, including the many local distribution centers and warehouses and associated short delivery movements in urban areas also should be addressed based on the states' comments.

Further issues/questions arising in the minds of the State DOTs dealt with concerns about the compatibility of each state's data with the surrounding state's data and the lack of coordination among those states. This issue relates to process but the outcome, if not corrected, are data that don't connect or data bases that can't be combined as needed. Several of the states spoke to the potential redundancy among the data collected by different states in addition to the other concerns.

Another issue, related to the funding issue noted above, is the drive for public/private partnerships on projects in the future. This calls for a different type of data to be generated, both for the private business plan and the governmental technical and political decision process.

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In sum, the states seemed to feel that the number one issue in the future would be congestion and capacity concerns overall, with contributing issues of traffic growth, safety and security and their effect on capacity and efficiency of the overall system. Other issues affecting the type and construct of needed data included adequate funding, energy and the environment, intermodal facility development and technological innovation.

Needed Data

Accurate data are critical to the needs of the states and some of these data suffer from obliqueness. The states felt that the state public data were fairly accurate but the private data were sometimes found to be inaccurate. Further, the regional and national data bases identified in chapter 1 were more accurate than those local public data, often developed by special interest bodies with acknowledged biases. A concern about the accuracy of private data was mentioned, especially since it is less frequently collected than public efforts but still utilized by data vendors and buyers.

States seemed to be concerned about the limited information on freight movements and patterns, again, especially on an origin-destination or commodity/industry level. Acquisition and utilization of such data would answer one of the major needs as identified by the states. This need is further exasperated by the recent transportation reauthorization legislation and its emphasis on freight and relevant freight data. This occurs at a time when freight data collection and evaluation have not been, and may still not be, a mainstream function in most states; to wit, the location and profile, (or lack of it), of various state's data offices should be noticed.

The types of data utilized and the problems associated with these data include the limited freight baseline study available in most states, resulting in freight data

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that are out of date or not available, such as smaller truck trips, local distribution patterns, etc. If shipment origin and destination pairs were developed correctly and more completely, model builders and state wide planners could operate with the same toolkit of analytical approaches, increasing the overall productivity of analyses and planning.

Micro data needs are those of routing and time of day, real time operational data, the domestic leg of the international shipment, shipment weight and truck configuration, volume shipped and actual road route used specific origin and destination of the shipment, land use at both origin and destination sites, etc. It was felt by respondents that such studies, done at both the small urban delivery level and the overall state flow level and inclusive of international shipments, would answer many of the questions and needs of the freight planning, modeling and policy community.

Data Limitations

The states identified the data limitations in the fashions discussed earlier. Data are often inaccurate, incomplete or missing, relative to the goal of the study or policy discussion underway. Consultant support is often used to fill in those data gaps but are expensive, too general and don't often allow data sets to be combined.

Existing origin destination studies are few and suffer from being outdated rather quickly due to the dynamic nature of the transportation market. As such they have to be used with corrected assumptions, modified and recalibrated as necessary. These studies continue to provide much of the analytical power of the state wide evaluations but selective use of the data is appropriate to avoid drawing implications past the power of the data.

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The major limitation is the shortage of publicly available data. The data sources identified in the extensive review in chapter 1 are both public and private. Private transportation or commercial businesses are reluctant to share their databases for proprietary reasons or competitive disadvantages. This concern is compounded by the expense of manual interviews and counts, though these counts are the most accurate and are available to the public.

Related to the above is that fact that outdated data are better than no data, but data do die...as far as usefulness of policy considerations or project evaluations. Most data sets are five years between collections and some of the better ones rely on a ten year time span between collection, again do to the expense and the magnitude of the data collection task.

Another limitation is the dearth of good freight data in urban areas. States have started collecting some of these data but usually in partnership with local port, MPO or RTPPO efforts. Because of the physical difficulty of collecting such data within urban boundaries existing data in most states do not offer the needed information in this critical area. Such an area is even more critical because of the pressures of passenger movements, combined with local freight movements, on the overall system.

Summary

These data serve two sets of customers, private businesses and governmental entities. Over all, the stated need is for a coordinated approach to data generation, at the policy, program and project level, as the data needs are addressed. Existing and newly created data need to be transparent as to source, method of discovery, costs to access and strengths/weaknesses.

These two initial chapters of this report set the stage for the in depth interviews and internal focus on the State of Washington. With the basic understanding of

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what data sources are available, what data are needed and what data limitations exist nationally, specific attention is now paid in the second part of this report to Washington's specific data needs and the data framework that would be useful to achieve and answer those needs.

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Chapter III: Washington State Freight Data Users

This chapter focuses on information collected from Washington State freight data users and transportation policy planners/personnel, in order to document the specific data and information sources utilized by different constituents within the state and illustrate the freight data needs across different state agencies and transportation organizations. The information presented in this chapter was collected at two separate freight data discussion meetings in Washington State; one on the west side (Sea-Tac, WA) and one on the east side (Spokane, WA). Given the obvious economic and socio-demographic (urban/rural) differences between these two regions, information was collected separately to allow the unique data sources / needs to be detailed from each region. Representatives from the freight transportation community in each region were invited to complete a short freight data user questionnaire prior to the meeting related to current freight data sources/uses. This information was further clarified and expanded at each freight data user meeting.

Table 6: Freight Organization Attending Freight Data User Meetings

Western Washington Meeting Organization/Attendees (March 5, 2007)	Eastern Washington Meeting Organization/Attendees (March 12, 2007)
<ul style="list-style-type: none">• Husky Terminal Services	<ul style="list-style-type: none">• Benton-Franklin Council of Governments
<ul style="list-style-type: none">• Northwest Container Services	<ul style="list-style-type: none">• Center for Trade and Economic Development
<ul style="list-style-type: none">• Port of Portland, OR	<ul style="list-style-type: none">• Kootenai/Spokane County MPO/RTPO
<ul style="list-style-type: none">• Port of Seattle, WA	<ul style="list-style-type: none">• North Central Washington, MPO/RTPO
<ul style="list-style-type: none">• Port of Tacoma, WA	<ul style="list-style-type: none">• Palouse RTPO (Whitman, Asotin, Garfield, Columbia Counties)
<ul style="list-style-type: none">• Port of Vancouver, WA	<ul style="list-style-type: none">• Port of Seattle, E. Washington Rep.
<ul style="list-style-type: none">• Puget Sound Regional Council	<ul style="list-style-type: none">• Washington State Department of Transportation, East Region Office
<ul style="list-style-type: none">• Washington State Department of Transportation, Office of Freight Strategy and Policy	<ul style="list-style-type: none">• Washington State Department of Transportation, Office of Freight Strategy and Policy
<ul style="list-style-type: none">• Washington State Freight Mobility Strategic Investment Board	<ul style="list-style-type: none">• Washington State Potato Commission
<ul style="list-style-type: none">• Washington State Department of Transportation, Seattle	<ul style="list-style-type: none">• Yakima Council of Governments
<ul style="list-style-type: none">• Whatcom Council of Governments	

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Western Washington Freight Data Discussion: Current Data Use and Data Needs

The following information is provided in greater detail in Appendix A, where specific response information was documented during the individual freight data discussion meetings. Two tables were created for each meeting, capturing current data use and freight data needs. Practically all respondents/attendees indicated that in order to address necessary policy, planning and project needs, a variety of information/data sources were utilized. Below is a summary for those organizations which provided information.

Port of Portland

The Port of Portland is somewhat unique relative to the ports of Seattle and Tacoma, given that it is the only area port which maintains a research department (and professional research personnel) and is involved in a variety of research efforts. Almost all of these research efforts influence policy, planning and projects at some level. However, there are four primary data sources that are utilized by the port including the Portland-Vancouver commodity flow forecast, the national (state-to-state) commodity flow forecast produced by the Bureau of Transportation Statistics, the regional trade capacity study and the regional freight data collection project in the Portland/Metro area. The Portland-Vancouver commodity flow forecast is conducted every five years and provides detailed commodity flow information on 41 categories, by mode. The national commodity flow study is useful for state-to-state comparisons of commodity movements and the regional trade capacity study provides regional changes in land-use patterns and the ability of the region to accommodate future freight trade. The recently completed regional freight data collection project should provide more detailed urban freight information relative to origin-destination, commodity, route and time-of-day information. The Portland/Metro regional freight data collection projects represents a partnership by the port (with the Oregon Department of Transportation and Portland Metro) to develop improved freight data within the urban area. When making transportation investment and policy decisions, the port attempts to take a broad

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perspective such that decision to improve freight flow in one area doesn't create bottlenecks in other areas (modes). Future efforts to collect/compile freight information/data may be more successful if the broader region joins forces and submits proposals for federal research dollars.

Port of Seattle

The Port of Seattle also relies on a variety of data sources to address port and harbor transportation issues, including the Puget Sound Regional Council (PSRC) truck model, the Washington Public Ports Association rail study, the Container Cargo Forecast study and several studies conducted by Heffron Consulting related to the Duwamish Access Study. Similar to the Port of Portland and the Port of Tacoma, the Port of Seattle is investing in data collection efforts through the development of an RFID system to track containers moving into/out-of the port area. Once completed, this will allow detailed information on route, origin-destination and time data on container shipments. Unlike the Port of Portland, the Port of Seattle is not focused on policy issues but rather program and project level issues.

In responding to the current freight data needs, the Port of Seattle indicated that specific objectives regarding how the information would be used should first be decided and then let this shape what would be collected, organized, compiled and modeled. The broader economic significance of transportation infrastructure to support freight movements and the relationship between the efficiency of this freight system and the health of the local economy should drive our freight data framework.

Port of Tacoma

The Port of Tacoma utilizes the greatest breadth of data and information sources, including:

- PIERS Data-
- Washington Public Ports Association Rail Capacity Study
- Washington State Transportation Commission Statewide Rail Capacity Study
- Comparative Port Studies on Truck, Road and Rail Capacity and Traffic

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- Portland Metro Data
- Port of Portland Data
- Data from private studies conducted by Heffron (Regional Freight Data Collection) and Parametrix.
- Portland State University: Portal Data Project
- Regional Transportation Council Data
- BNSF: Business Exchange System for real time info on trains/port movements

The primary purpose of freight data is to support port project expansion plans and also to improve efficiency and eliminate freight bottlenecks. Emerging freight data needs include access to information related to freight congestion and emission modeling to address growing air quality concerns, requiring greater detail on specific freight movements, by commodity, origin-destination and route. The Port of Tacoma has already completed several growth/capacity studies in recent years and doesn't rank this type of information as a high priority need.

Port of Vancouver, WA

The Port of Vancouver is much smaller than the neighboring ports of Portland, Tacoma and Seattle and also indicated that they utilize several sources of information to satisfy freight data needs. Some of these sources are also those listed by the neighboring ports or are provided by the ports themselves. The freight data needs documented by the Port of Vancouver included more detailed information on truck counts, shipment commodity and origin-destination information on specific highway corridors. The port hoped to follow the Port of Tacoma's lead in implementing technology to help track/access this information for freight moving through the port's facilities.

Puget Sound Regional Council (PSRC)

The PSRC maintains and updates the regional transportation truck model which forecasts truck trips to/from transportation analysis zones in the Puget Sound area and allocates truck trips onto the street/highway network. This model is utilized by many regional agencies, including local/county RTPO's and transportation planning agencies for evaluating project/planning needs into the future. The model is built on employment data by industry classification (NAICS) and validated against truck trip data (for each

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highway segment) compiled and collected at the WSDOT Transportation Data Office (WIM, PTR, Mobile Traffic Counters). The model is updated and recalibrated every three years and provides forecasts up to thirty years into the future. Given access to more detailed information on commodity specific shipments by highway segment in the urban area, the PSRC truck model may be better estimated, calibrated and forecasted with increased accuracy. This would have multiplier effects throughout the region for area agencies which rely upon the PSRC truck model forecast.

Washington State Freight Mobility Strategic Investment Board (FMSIB)

FMSIB partners with several agencies throughout the region and utilizes many different data sources to help prioritize freight investment projects and measure performance improvements to the freight system. FMSIB influences policy, program/planning and project level issues as part of evaluating alternative freight investment outcomes.

Among the data sources commonly utilized are the Marine Exchange Reports which track all marine vessels accessing area ports (cruise and freight vessels) and FHWA reports/data. One recent study, conducted by the firm Science Applications International Corporation (SAIC) tested the process for counting trucks via GPS transponder, video surveillance and loop detectors. FMSIB also received funding in the 2007 legislature to partner with Nextel and purchase data on truck shipments, routes, origin-destination, time-of-day and delivery locations.

Washington State Department of Transportation, Seattle/Urban Corridors

The WSDOT in Seattle relies primarily on the Freight Goods and Transportation System (FGTS) classification of freight tonnage on specific highway segments, in addition to the vehicle classification counts compiled by the WSDOT Transportation Data Office. In addition, they utilize information collected as part of individual projects such as the Alaskan Way Viaduct Project. However, when asked what their freight data needs were, they provide a very extensive and detail list of freight data attributes that are needed. These include,

- Daily truck volumes and percentage of daily traffic
- AM and PM Peak period volumes and percentage of peak period traffic.
- Time of day truck volume variations.

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- Truck classification counts on selected routes to determine the mix of respective truck classifications.
- Commercial vehicle volumes (these are vehicles used for commercial purposes) as compared to truck volumes.
- Economic data:
 - Commodity flow
 - Cargo value
- Oversize/over dimensional vehicle trip demand
- Breakdown of traffic by FHWA truck classification and measured axle weights by classification
- Load zone availability and utilization
- Vehicles that may be exceed the legal axel load
- Truck travel time studies
- Change in number of trucks and drivers to mitigate the negative impacts of growing congestion
- Intermodal yard rail and truck volumes
- Local rail service (to industrial properties) frequencies
- Number of truck trips generated by the Port of Seattle, travel routes, time of day characteristics
- Current truck counts on state highway system with origin-destination, higher quality data.
- Air cargo information

Whatcom Council of Governments

The Whatcom Council of Governments is very active in the freight community, being within close proximity of one of the busiest ports in the country (I-5 to/from Canada) and significant freight trade moving up/down the I-5 Corridor. They are primarily focused on improving freight system efficiency and performance at the port of entry and rely on a plethora of data sources to address different policy, planning and project needs. These sources include the U.S./Canadian Customs data on bi-directional truck flows, the 2003 Rail Study conducted by the IMTC and Reebie Associates, Short Sea Shipping Study using Transship, TransSearch, and SFTA Data, the 1999/2000 Commercial Vehicle Intercept Study, U.S. Customs Manifests, Canadian National Roadside Survey and the Truck Processing Study conducted by the IMTC, Western Washington University, the Border Policy Research Institute and Transport Canada.

In terms of current freight data needs, the Whatcom Council of Government indicated that better partnerships are needed with private freight companies to better understand

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the business/economic environment of how these companies operate and some way to “incentive-ize” the private business sector to help provide information on freight movements and freight data. Accurate and convenient access to annualized tonnage information, by mode was also listed as needed, as well as itemized performance objectives.

Washington State Department of Transportation, Office of Freight Systems Division

Perhaps the most active state organization in the freight arena, the WSDOT office of freight systems division utilizes an array of different data sources to help guide/shape public transportation policy and address agency needs. Much of this information is compiled and presented as part of the Washington State Freight Plan, one critical component of the larger Washington State Transportation Plan. The different data sources includes internal WSDOT data captured within the WSDOT Data Office and local projects information, in addition to data from other state agencies such as the department of revenue, the Community, Trade and Economic Development (CTED) organization, the state Department of Agriculture, and data from the local/regional ports associations. This information is supplemented with data from the Bureau of Transportation Statistics, Office of Financial Management, agricultural commissions and the statewide freight research effort known as the Strategic Freight Transportation Analysis (SFTA) study. All of this information is utilized, to varying degrees, for freight policy, program planning and project level needs.

Even though the WSDOT Freight Office currently utilizes a wide variety of data sources, their current data needs are extensive, especially for detailed information on truck counts and performance measures within the urban/metropolitan areas. Better information on commodity and industry specific freight movements are needed, in addition to information on freight system bottlenecks and supply-chain inefficiencies. Greater access to multimodal information is also needed, especially related to project level benefit-cost information and improvements to the freight system performance. Origin-destination and route level information is needed and necessary for all industry

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sectors and the ability to predict future freight growth by highway segment and industry sector.

Eastern Washington Freight Data Discussion: Current Data Use and Data Needs

Similar to the Western Washington Freight Data Discussion results, the Eastern Washington information summarized below is also provided in more detail in Appendix A. While many of the data sources utilized by Eastern Washington Freight Data users are similar, the different planning, programming and project challenges of the more-rural side of the state are evident. Generally, the Eastern Washington Freight Data users indicated a greater need for rail data, including information on shortline rail operations and abandonment impacts on shippers and the remaining infrastructure.

Benton/Franklin County RTPO

The Benton/Franklin RTPO is a very active transportation planning organization in Eastern Washington, comprising the region surrounding the cities of Pasco, Kennewick and Richland (Tri-Cities), WA. To address prevailing freight policy, planning and project needs in this area, the Benton/Franklin RTPO utilizes several sources including information collected as part of the EWITS/SFTA research projects at Washington State University, the Washington Transportation Plan, FGTS Classification for state highways, WSDOT Traffic counts, major employer reports for the area, the marine cargo forecast and the FHWA Freight Facts and Figures. In addition, they supplement this information by collecting primary data for local port and airport freight movements via shipper surveys. When asked about current data needs, they indicated that currently it is challenging to find accurate, detailed, up-to-date information on county road shipments (volume, commodities, specific highway segments, etc.). Also, there is very limited information related to rail line abandonment throughout the region and the impact potential (or actual) abandonment has on current shippers, alternative shipping services and impact on other modes and transportation infrastructure. Better information on the economic significance of the Snake/Columbia waterway system is also needed.

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Center for Trade and Economic Development (Eastern Washington)

The primary role of CTED is that of information broker to help facilitate economic development and trade growth throughout the state and region. As a result, they serve as a conduit between prospective business partners and information/analysis that may foster new business growth or established firms relocating to the region. In the Eastern Washington region, CTED also utilizes EWITS/SFTA data and also trade information from the Ports of Seattle and Tacoma, primarily for project specific needs rather than policy and program issues. While no specific data needs were provide, they echoed other participants' requests for more accurate, timely, accessible information on freight flows in rural areas.

Kootenai/Spokane County MPO/RTPO

The Metropolitan Planning Organization of Kootenai/Spokane counties indicated that much of the data they utilize for development of their travel demand model originates from an in-house survey conducted by this agency. They supplement this information with data from the Roads Standard Study, in addition to information collected/compiled as part of the Avista led effort known as the Inland Pacific Hub Analysis to help forecast future growth of north/south freight traffic along the U.S. 95 Inland Hub. In terms of persistent data needs by this agency, accurate employment data (location specific) from the Department of Revenue is very difficult to obtain. This information is also an input into the traffic demand models.

North Central Washington MPO/RTPO

Similar to the nearby MPO's in the region, much of the freight data required by the North Central Washington MPO/RTPO is obtained internally, via studies and surveys through the local region. This planning agency utilizes WSDOT Traffic Counts to help supplement the recently completed study on Washington/Canadian Freight Movements (primarily wood/natural resource products). An extensive list of current freight data needs were provided by this planning agency, including better information on truck shipments, commodities hauled, vehicle configurations, rail data, shortline railroad

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information and abandonment impacts, increased coordination of truck weigh stations, rest stops and fuel stations, and information on class I railroad container movements. This agency felt that it could do a much better job planning for transportation infrastructure investments if they had access to this information on a more timely and consistent basis.

Palouse RTPO (Whitman, Asotin, Columbia and Garfield Counties)

This organization is embarking on an extensive data collection effort in order to fill needed freight data and transportation shipping information gaps. A consulting firm has been hired to collect information from freight shippers in each of the counties, with plans to conduct this survey every 3 to 5 years. They are also funding a study to identify a consistent standard for designating county roads “all-weather” status. For highway pavement condition information, they rely on the WSDOT Video of Pavement Conditions throughout each of the counties. However, concerns were expressed regarding access to freight movements on all modes into/out of each of the counties. Better access to railroad information, specifically shortline railroad information and how regulation changes impact operator services. An additional desire was expressed regarding access to data on businesses located outside the state but could have significant consequences on freight movements within the state.

Port of Seattle, Eastern Washington Representative

The eastern Washington representative for the Port of Seattle indicated that they work to develop business relationships with customers throughout the region in order to obtain the necessary information related to freight movements. Information from PIERS was also utilized, as well as specific studies targeted for business opportunities such as the Comparative Price Analysis study conducted between Quincy/Tri-Cities recently.

Washington State Potato Commission

The goal of the Washington State Potato Commission is to help market Washington potato's and identify growth opportunities, including improving the freight transportation

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efficiency of moving potato's to market (both fresh and processed). As a result, they utilize many sources of information including USDA reports, Washington State Department of Agriculture reports, production information from the National Agriculture Statistical Service and trade information from different national and international sources. For information on local movements, the commission has funded a study, in partnership with the SFTA research effort at Washington State University, to identify how/where/when potatoes move from production to market. The current freight data needs expressed by the commission included better information on the state/federal transportation priorities (by mode) to help align their priorities and plan for future investments.

Yakima Council of Governments

The Yakima COG conducted their own Origin-Destination study several years back in order to obtain the necessary freight and transportation data for planning/project demands. They also expressed a desire to have better access to information of freight movements within their county.

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Chapter IV: A Systematic Freight Data Framework for Washington: Gaps, Tools and Approaches

This report thus far has dealt sequentially with data sources, state data usage and needs, and specific data usage and needs for the State of Washington. A survey of the literature and studies provided an extensive list of data sources currently available and used by the transportation industry in attempts to understand and analyze transportation issues and search for solutions. These sources were categorized by geographic level (international, national, state and regional/local), emphasizing the many disparate sources of differing data that were currently, if not consistently, available.

This was followed by a review of states' needs relative to data availability. The analysis of 15 states was structured as to various needs for the data: policy, program/planning and project. Each level indicated differing types and applications of the data required for the alternative purposes of the three needs. The specific needs of the State of Washington were then identified by the use of focus groups, a mail survey of ports, MPOs and RTPOs, and examination of projects/studies completed or underway in the State.

It was found that many sources and much data are available for the decision makers, both public and private, in the State. Data availability has generally improved over the years, with many of the entities making creative use of the various data sets and series that are currently being produced. Specific areas of missing data and information were evident and were stressed in the literature and by the respondents.

But, the work by the TRB and the responses of the states in the survey reveals a deep need for a systematic approach to producing, maintaining and presenting the current and future data. In this section we examine the shortage or gaps between the identified sources and structures of current data and the needs of the entities undertaking policy formulation, planning efforts or project development. The goal is to specify the gaps in data, to suggest approaches to filling those gaps and to offer an overall framework for

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the much needed coordination of maintaining and developing this overall data base in a dynamic, responsive fashion. These data need to be collected, compiled in response to need and requests, presented and advertised to the potential users of the data, made easily accessible, maintained and finally, utilized by the entities to improve their understanding of the transportation industry, leading to improved decision making by the private business and public agencies. In the final section we suggest a map/process to combine these current and new data series while continuously maintaining the system.

Geographical Data Gaps

International

The interest in international flows and movements continues to increase. Whether at land ports/border crossings or at maritime/air cargo ports of entry, data needs are evident and data gaps do exist.

Traffic flows across U.S./Canada ports of entry are currently being tracked but not on a consistent basis. The Federal sources do provide traffic levels on a general trade basis, but not on an origin/destination specific level. Customs data as well identify traffic flows at the border crossings but again, no detailed information on commodity composition by value, weight of vehicle, origin, destination or route data are produced. Information on shipper and receiver identification are collected but are not generally produced to the public. New editions of the Canadian National Roadside Survey may serve to generate, once again, selected pieces of the required data set. These data series would gain from increased collection of particular shipment characteristics but at this time this information is not part of the charge to the collection agency and therefore is not collected.

Traffic flows across maritime/air ports/points of entry have received the attention of the ports, customs bureaus and now, security, agencies. General flows for maritime

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containers are available from the Piers data both to and from the alternative ports. General bulk shipping movements are also available. What is missing is the actual movement of those containers/shipments in the domestic or international leg of the supply chain. These container/commodity movements are critical components within the volume of movements on domestic highways and railroads of the internal transportation system. The local drayage of these containers and break bulk commodities has received little or no attention and the descriptive data on these movements are not yet available. Only individual studies, such as those done by IMTC and the Port of Portland/Metro, offer information and this is only on a piecemeal basis.

Information on the ports and the generated traffic also suffer from a lack of data that quantitatively and consistently estimate the degree of productivity or congestion in movements from local port yards and distribution points. Such analyses requires specific data flow information, by time of day, vehicle classification and configuration, peak volumes (of both truck/rail relative to other uses and volume of use of the roads or trackage), shipment value and destination of the movement. Knowledge of shipper and receiver quality of service needs such as length of and variability in transit time, damage frequency and magnitude and overall risk to the shipment, as well as total rate/price of the service, are also required for international shippers/receivers to make hard business decisions about modal choice within the supply chain. Filling this data void would also assist WSDOT and fellow agencies in prioritizing the investments useful in improving the efficiency and effectiveness of moving both port and non-port traffic through those areas of identified congestion.

These data are further constrained because several of them report state of origin of the shipment only as the last section of the movement. Hence, consolidated and intermodal shipments are often lost in the movements and some over/under estimation may occur.

Traffic flows of an international origin or destination are also not well tracked on a regional basis within the United States. Cargo flows, as they enter into the domestic leg of the supply chain, are not known by ultimate destination or origin, and certainly are not

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known from published data by shipper or receiver location. Knowing this regional aspect of the flows of the international cargo would allow overall industry trade economic perspectives to be used to project future usage, needs and attendant investments on an entire supply chain foundation. Such data would permit identification of congestion points, capacity constraints and other performance related measures on movements of these international traffic components.

National

Commodity flows across the nation are very aggregate and non origin and destination specific. Information on those movements by origin and destination (receiver and carrier location) as well as route detail is an existing data gap. The existing data bases at the national level are proprietary in nature, expensive to access and do not allow for corroboration amongst the data bases. Rail data do provide some of those movements but usually only on a region by region basis, with some obvious missing commodity and trend information. Specific information will allow combining the modal information into total volume corridor studies, a commonly desired ability.

Values and volumes of commodities by corridor also are difficult to create from available data, except at a very aggregate level. Some of the current data bases are synthesized or inputted from other not directly correlated data sets. The importance of intermodal locations and rail/highway transfer points can not be readily determined under the current data. An origin/destination study or studies that trace these flows, over different rail and road segments, would allow national prioritization of investments at choke or congestion points or points of high economic value to the nation's economy. A series of data overtime would strengthen the ability to trace and dissect the dynamics of the transportation industry as well as the supply chain decisions being made by the shippers and receivers.

Long distance travel times and safety experiences as an indicator of quality of service are not available with the current data sets. Published data, whether rail, air or

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highway, do not include the modal travel times. Such information is critical in fully estimating competitive demand for transportation by mode, corridor or commodity/industry and is an existing gap.

State

Shipment origin and destination is the data gap that is acknowledged as being so prevalent. Knowledge of the routes used, the commodity characteristics, loaded and unloaded weights (total and by axle), value of the payload and hazardous materials movement is basic and critical. Further information on the mode of shipments, specific routing, time of day (peak hour movement), and vessel or vehicle classification completes the most basic needs of analysts in the state. Such data are only available for the State from the EWITS and SFTA surveys done by Washington State University. Such data are already almost five years old, cover only the routes captured in the statewide survey and only general inferences can be made from these data sets. The gap relates directly to the fact that surveys like these must be conducted in a statewide framework, as broad as the budget will allow and on a recurrent basis of 3-5 years. It is the only type of data base currently available that combines all the data characteristics detailed above. If examination of commercial vehicle numbers versus all truck volumes is an issue, this data base structure will be needed to fill the gap because typical traffic counts cannot discriminate amongst vehicle types, just configuration. New camera and “tagging” devices may help fill this gap in the future.

Local distribution, retail and warehousing movements are a major gap when examining data needs. Little is known about such movements, yet modeling estimates of up to 80% of total trips are recounted in the literature. Trip patterns, weights, vehicle configuration, and routing are not systematically collected in the state. Surrounding states and some state Universities have done warehousing studies and other piecemeal/focused studies detailing these movements and operating characteristics of the firms, but it is difficult if not impossible to logically transfer those findings to other locations, ports or movements. Truck travel times, routing, number of stops, weights, etc. are needed but

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not available information. These data can be utilized in prioritization of urban and rural investments, port traffic flows, air quality work, safety investigations (including hazardous materials monitoring), security analyses, resiliency studies, and the transportation modeling that underlies most of these studies. Local economic impact studies also rely on having these local flows, and characteristics of those flows, available for analyses.

Basic daily truck volumes, and as a percent of total traffic, can be calculated in some detail from the massive amounts of data collected and managed by the Transportation Data Office. They are only produced at the locations of the WIM and other mechanical weighing sites on the Interstate and State roads. To be useful, these data require analysis that is often beyond the normal purview of the initial collectors of data. Such weigh stations are currently being evaluated as to redundancy or non coverage of relevant truck movements in the state, a critical issue for efficiency of data generation.

Oversize and/or over dimension vehicle or vessel trip demands is another data series that isn't currently available. Data currently exist only on an individual trip basis and a fuller understanding of the characteristics of these trips would be useful to plan for the occurrences and determine damage and financial assessments to fit each case. A data base inventorying and evaluating these movements would provide benefit to the State.

The traffic generated by ports and their economic activities in international trade or local economic development efforts is critical to understand. Traffic flows and any capacity constraints are not available in an ongoing series, and certainly not by route, weight and other dimensions noted above. Demand and trade projections rely on data of past, current and projected movements from and through the ports, accompanied by capacity estimates for various modal line segments. Such data would allow varied studies to be conducted, whether security evaluations, emissions controls, capital investment by public and private partnerships (and the distribution of benefits that underlies those partnerships), and overall supply chain analyses for the customers/clientele of the ports or development agencies.

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Determination of transportation hubs and generators of traffic and economic activity will aid many transportation planning efforts, both by private and public entities. Data on the service provided, the movements produced and the capacity of modes in any particular point in the overall transportation system will support efficient and effective investment decisions, transportation planning and other questions about freight movement. Origin and destination studies on an ongoing, if intermittent, framework may be the avenue to fill this data gap.

Regional/local

The data needs of within state regional and local entities are very similar to those discussed throughout this report but on a smaller, more focused scale. Most corridor, economic impact or travel studies require origin and destination by specific road segment of the routing, by weight, truck configuration, value and commodity type, and the other associated variables. Relevant information on trip generators or receivers is particularly of interest to the many studies conducted on the local level. Truck travel trends and forecast estimates are particularly dependent on origin and destination data to understand the economics of the movements through, to and from their area of interest. These data are available but usually in a segmented fashion. The same needs for data on local distribution, retail and warehouse, along with movements on county, state and interstate highways around the study area must be provided. The issue is that filling these data gaps on an ongoing basis requires coordination and funding, significantly above current levels.

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Data Gaps by Needs

An alternative structure for examining current data gaps is evaluating the “needs” for the data. The Washington Freight Transportation Plan divides the clientele of transportation planning and investment into those movements that serve global gateways (international trade components), those products and commodities that are made in Washington and are searching for markets, both domestically and internationally, and those movements that serve to enhance citizens’ quality of life by providing local distribution, warehousing service and retail availability.

Understanding the **global movements** requires intimate knowledge of the commodities/products being moved, the markets and origins for those commodities, the demand nodes for the commodities and the cost and market share by modes of the overall transportation system. National data sets do provide very aggregate information as to state flows, with some implied and assigned traffic destinations from various sources of data. No specific origin and destination as to shipper and receiver is available at this time on any broad basis.

Data specific to the port area’s global trade are also available, but usually only on a study by study basis. Industry aspects of traffic density, routing and operational characteristics are not normally produced from the ports or transportation agencies on a real-time basis, though the ports do a successful job in trying to generate such data on a project basis. This includes air, rail, truck and water modes in their relevant roles in the supply chain. Such data could be instrumental in evaluating congestion and chokepoints in the supply chain of global imports and exports. A time series of movements would be useful in strengthening the predictive capabilities for freight movements, especially those of truck, rail, maritime and air cargo now being utilized.

Made in Washington relates to the many agricultural, manufacturing and commercial products originating in the State and destined for domestic and international markets. Providing efficient and effective transportation and logistics support to these industries

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in an ongoing effort by state agencies. Specific modal shares, rates/prices, and services provided by the different modes are data that are not available except by industry or commodity by commodity market studies, such as those provided in the SFTA research effort. These are currently available in some detail. A useful data gap to fill is the provision by origin and destination studies, by mode, and then compilation into the total industry usage and movement profile. Ongoing origin and destination studies, with specific and detailed information by commodity, might be the vehicle to answer this issue. Such productive information could include rail car and track capacity work, truck and truck driver capacity, barge capacity under stress and other issues affecting the alternative modes.

Getting the product to the consumer reflects the need to understand the workings of the local distribution system, bringing quality of life service to local consumers and citizens. The data needs for this effort have been detailed above. Routing of vehicles, timing of delivery and pick up, value of products, time sensitivity of products and density of traffic all affect the models and transportation plans used at the city and regional levels.

Data Gaps by Mode

The traditional approach to evaluating transportation performance measures has been developing information and undertaking analyses by transportation modes. The focus now, at the state level and at the Federal level, is on the supply chain itself, determining performance of the overall transportation system as businesses make choices among modes. Much of the discussion above has approached the gaps in freight data needs in that fashion.

All of the data gaps identified above dealing with the origin, destination, shipper, receiver, intermodal nodes, weight, value, commodity, etc. are all applicable to each of the modes. The data sources for the differing modes do vary somewhat in what data detail and completeness, as indicated in the earlier discussion. Air suffers the most as

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far as route, weight, volume, etc. while rail analysis needs more information on origin and destination to be made available in the public venue. State wide origin and destination surveys have provided broad coverage for truck movements but local retail and wholesale distribution by truck is a conspicuously missing data set. Water or barge transportation, due to the Army Corps of Engineers work, has solid data sets available but suffers from the lack of data on its connectivity, at both the origin and destination end of the supply chain.

Freight Data Framework Approach

A massive amount of data is collected and available from a variety of sources (state, local, national institutions). But, these data are not complementary in all cases to each other, and are often not available in the format/time period that is required for different freight organizations and planning agencies throughout the state or are unknown to those individuals seeking specific freight information. In some cases specific types of information and data are available (as indicated by the review of data sources provided in this report) that may address many freight policy/planning or project needs. In other cases there are specific types of data that do not exist or are not at a fine enough level of detail (geographic or industry specific) and must therefore be generated in the future. Some approaches or considerations towards developing freight data as a strength, and freight data as a leadership position for the state DOT arise from the work done for this report.

Institutional Justification

The primary overriding impetus for this freight data framework is improved program policy/planning, freight system modeling, project analysis and institutional coordination. Increasingly, state governments and agencies are required to provide performance measures for state projects and prioritize investments which are competing for limited resources. By improving the accuracy, accessibility and availability of current freight data, measurable performance standards may be established and evaluated to help

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prioritize freight infrastructure investments. Additionally, by developing a coordinated freight data inventory/collection effort, improved budget efficiency may be achieved as freight data collection efforts no longer are conducted in a random, ad-hoc fashion. As stewards of the state transportation system, any subsequent improvement in system efficiency and productivity also improves taxpayer confidence in efficient investments.

Institutional Governance

It appears that, especially for the State of Washington, the current data being generated in the State are being generated quite efficiently. That still means that these data need to be supplemented and enhanced where data gaps exist and efforts made to improve complementarities among data series. This requires a multi-phased effort and data framework strategy such that a seamless “Coordination” of freight data evolves over time to address freight data needs throughout the state and region.

The recommended overall freight data framework is presented schematically in Figure 2 below, where a new Freight Data Librarian/Educator leads the overall effort and is supported by a Database Manager. Collectively this group will inventory/catalog existing data sources (local, state and national) and also coordinate future freight data collection efforts. The Database Manager will provide technical database management support while the Librarian will interact with state freight clientele (to develop freight data partnerships) and policymakers at the state and national level. Freight transportation research efforts at area Universities will also interact with the framework, especially to the extent new/additional data is generated. The following phases offer a freight data framework approach that would vastly improve freight data accessibility and build knowledge/expertise within the region/state/nation for a variety of policy, planning and project uses across agencies.

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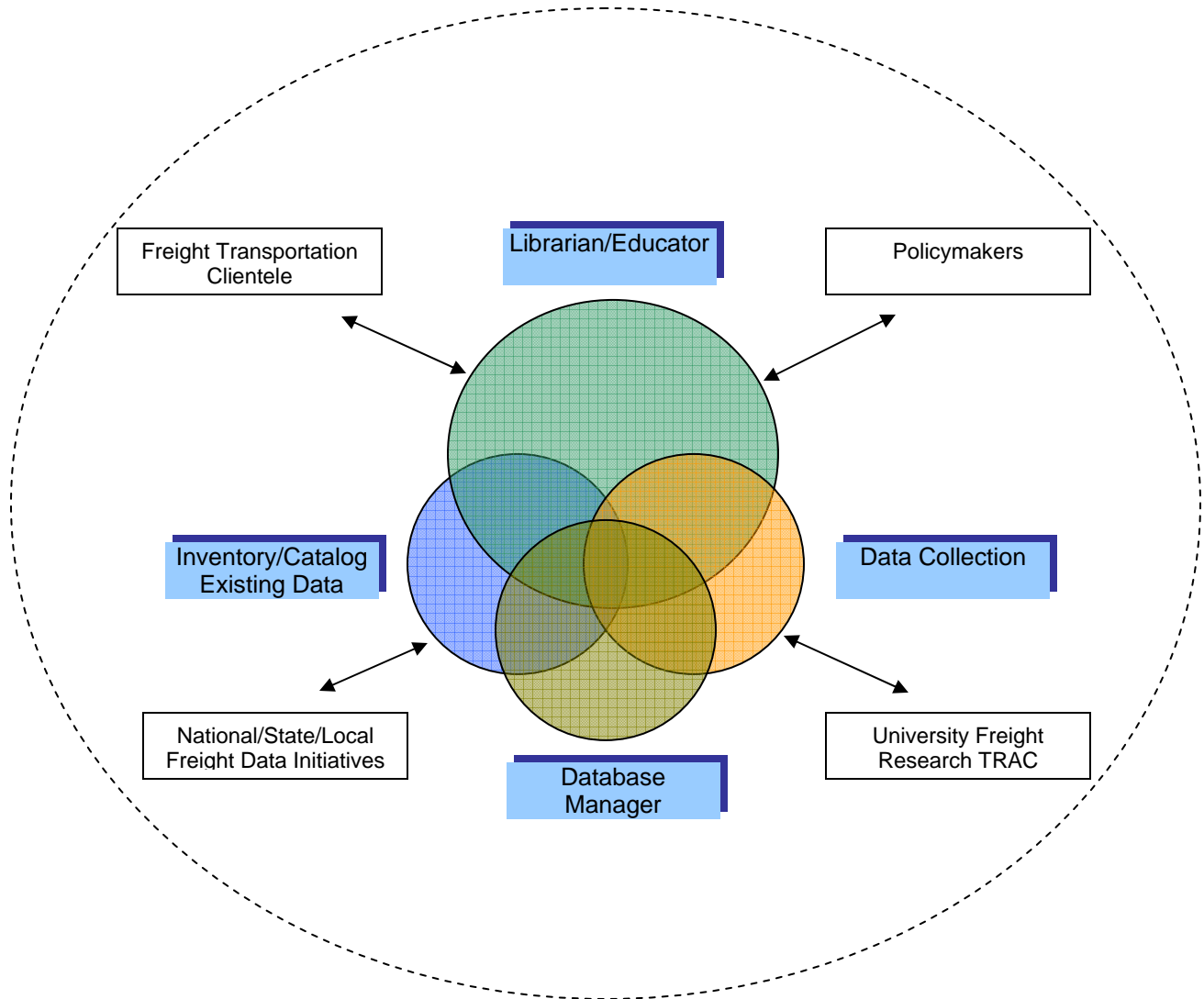


Figure 2: Washington State Freight Data Framework*

*The horizontal blue text boxes indicate the recommended activities and the vertical blue text boxes show recommended personnel additions. The upper white text boxes identify the clientele and the lower white text boxes present the data sources. The circles indicate the extent of interaction of the different actors and activities.

Phase I: Identification of Data Gaps, Needs and Uses

This phase has been initially addressed in this research report, but is included in the freight data framework due to the dynamic nature of business, freight movements and

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technology adoption. As governments and businesses evolve, and access to different data collection technologies become available at declining costs, the resultant freight data gaps and needs will likewise change. Therefore, a periodic inventory of available freight data relative to identified freight data needs should be performed throughout the state and region. This process may be incorporated into the expected activities/duties proposed within the freight data framework presented below.

Summary of key freight data needs/gaps:

- Greater geographic coverage and specific detail in urban/metro areas for origin/destination data, by commodity/industry sector.
- Reliable truck counts on county/local roads and highways, especially for small delivery-type vehicles currently not captured in industry studies.
- Information on a freight performance system for urban/metro and local roads and ability to predict growth into future.
- Data on specific industry's freight performance measures and how project/corridor changes impact freight performance efficiency (cost/benefit).
- Improved data/method/technology/criteria for identifying/ranking freight corridors throughout the state.
- Comprehensive origin/destination traffic flow on a statewide, commodity specific and vehicle classification basis.

Phase II: Librarian/Educator, Resource to Manage Freight Data Warehouse

Much freight information and many data sources currently exist in a variety of geographic detail, at a multitude of agencies, and in a plethora of formats. Many of these data streams have evolved over time to address different agency needs and replication of this information within a state freight data warehouse is neither efficient nor viable. However, obtaining access to this information on a continual basis is both critical and viable with the creation of professional expertise to serve as a conduit

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between state/regional freight data needs and those existing local, state, federal, public, private data. This resource/librarian position would serve a valuable role within the region by providing freight data knowledge and continuity to area constituents, including local and state transportation officials and policy planners, by keeping apprised of all existing/potential freight data sources and evolving freight data collection efforts at both the state and national level. This individual/resource would not just be a “data source” for the state, but must also reach out to all agencies and businesses requiring or holding transportation flow and operational data and also participate as freight data needs arise and are discussed at the policy level, planning/program needs and specific project levels. The role/duties of this dedicated resource would be analogous to that of a Librarian/Educator for the state and region where freight data users throughout the area go to access needed information and data and whose responsibility it is to be actively involved with freight data collection processes, data needs and research efforts. This resource would also serve as the facilitator for the many needs, sources and activities related to data in the State. The primary duties/expectations of this position include:

- Freight data intelligence, knowledgeable at the state and national level, of the many freight data sources, organizations, and emerging data collection efforts.
- Organize/document currently available public freight data and provide access via directory of web links with summary information regarding data attribute detail. This information would be maintained and updated on a continuous basis.
- Archive freight data streams and merge with other data sources as necessary/applicable.
- Disseminate the compiled/maintained and data sources throughout the state/region.
- Cooperate/Coordinate with the design/development of area freight data collection efforts to address known gaps and freight data needs.

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Phase III: Freight Database Manager, Technical Resource

Providing technical and database management support, the Freight Database Manager will design/develop and maintain the freight data warehouse for information that is determined to be housed internally within the freight data framework. This may include a variety of data currently being stored at academic institutions or at local agencies as part of creating a freight data repository that is updated and maintained into the future. This position would require additional technical resources in data management, data synthesis and data mining to service all freight data clientele. The skill-set of this resource should be technically advanced and proficient with relational database design, development and implementation for large-scale data warehouses. Additionally, this resource will be required to interact with the strategic planning component and provide support for the Librarian/Educator.

Phase IV: Dedicated Funds for Operations/Data Development (Long-Term Strategic Planning)

A significant component of the proposed freight data framework is the ability to address current freight data gaps and needs as they arise and, in a systematic, coordinated fashion, to maximize data collection efficiency and accuracy. Therefore, the fourth phase of this proposal is to dedicate resources to design, develop and implement freight data collection efforts to address those deficiencies outlined above. These may include a myriad of technologies and collection approaches to satisfy the freight data details and attributes necessary for future policy, planning and project needs.

A continuing component of this effort will involve developing relationships with the private or quasi public firms in order to learn from them their desired transportation system performance and their needs, and earning the confidence of these decision makers. This high level understanding between the business community and the public service providers will allow data to be generated on the ground in a private-public relationship, with a win-win outcome. These activities to fill the identified data gaps will

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range from individual studies, often very local in nature, to state wide efforts to understand and document the flows on the modes resulting from and affecting the business decisions.

Data Generation Possibilities

Developing new data conduits can be done in several ways, and has been accomplished to varying degrees of success in many studies. Remembering that the needs for most data involve a dynamic ongoing information flow, studies can be done by private carrier surveys, which provide intimate data on individual trips which, when summed carefully together, provide the desired routing, configuration, commodity, origin, destination, etc. These have been used very successfully in the State of Washington and the State is considered the leader in this effort.

The second common source is distributor surveys where private and public generators of traffic are queried as to pattern of vehicle or vessel usage, timing, commodity, routing, etc. Shipper surveys strive to identify the universe of shipments, usually from an industry of interest, providing data on value, volume, ton-miles, modal choice, rates and other variables of interest to the researcher or policy maker. A commonly used survey source is that of the receivers, who in many commodity movements, are the ultimate decision makers as to modal choice and routing. Major importers, retail, wholesale and distribution centers are often reached in this survey.

It is evident throughout this review and report that origin and destination studies, of carriers, shippers or receivers, are an ongoing need in the State. Both statewide and local distribution movements suffer the most from data gaps. Updating the statewide survey with a carrier survey appears to be the most manageable and productive. A survey every 3 to 5 years would provide current data that reflect the dynamics of the transportation system serving the shippers and carriers of the State. This could be supplemented by similar surveys, done on a rolling basis (one survey done every year or so) at the local distribution level, so that every five years every area would be

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covered. These surveys would be refined on focused corridors in an “as needed” basis within that time period. The alternative tools to generate these data might usefully be combined in a package, utilizing information from shippers and receivers to determine traffic flow and operating characteristics of these local businesses.

Another alternative is freight informatics, which is being undertaken at various levels in the State and could be used in the future for the two origin-destination studies mentioned above. This approach is the use of ITS with all of its sensors, transponders, and other monitoring devices that can help provide real time information to fill the identified data gaps.

These new technologies will require two specific investments. The technologies are expensive and they require the agreement of the carrier or shipper or other agent in the supply-chain that handles the container or product. The financial investment by carriers is currently being forced in some movements by the issue of national or homeland security but not on a global basis. The second component, the willingness of the private operator or business to accept or even fund these technologies , will have to be agreed to by the business or mandated by the appropriate authorities.

Data Generation Timeline

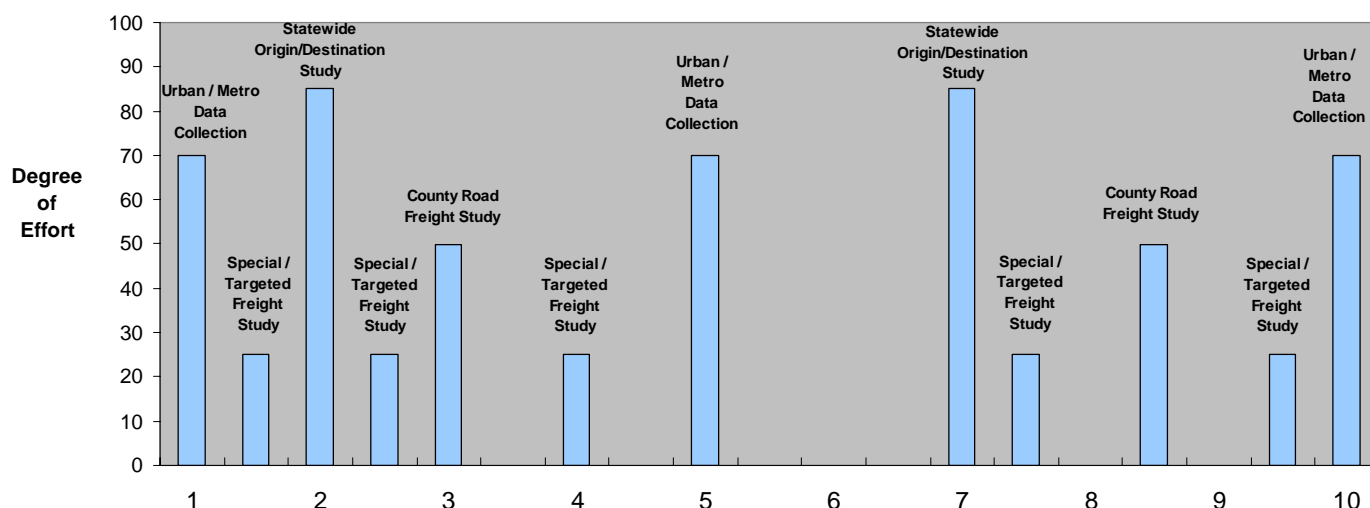
The data collection efforts may be sequenced into the future such that data gap/needs are addressed on a continued basis and allowed to capture the dynamic changes which occur. This timeline is presented below in Figure 3, where four separate types of efforts are implemented on a revolving basis, as needs require and budget resources allow.

Given the existing freight data gap on urban freight movements, the initial effort in the first year is a data collection effort within the Puget Sound area to map freight movements, similar to the effort completed in Portland, Oregon with the Port of Portland and Portland Metro. This information could be complemented with targeted/special data collection efforts for specific geographic locations or business activities as guided by the legislature or the WSDOT freight policy office. These types of targeted studies would

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be conducted as needed throughout the next several years. An example of these types of studies are those currently being led by the WSDOT Freight Office related to predicting truck traffic on state highways into the future for specific industries (forest products, agricultural products, warehousing, etc.). On a five year rotation, it is recommended that a statewide data collection effort is undertaken, similar to those conducted under EWITS and SFTA at Washington State University in 1994 and 2003 respectively, using the improved technologies available over time. Additionally, freight data collection on County Roads is also recommended every five years.

Figure 3: Proposed WSDOT Data Collection Efforts Through Time



This effort to achieve the agreement of private businesses would again be the role of the new “coordinator” of freight data for the State of Washington. If this institutional structure is combined with the new technologies, and the funding to support both the technology applications and the new position(s) made available, the State of Washington will have the ability to fill data gaps while leading other states in freight data provision.

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Summary and Conclusions

Existing freight data were found to vary in its completeness and coverage. A framework for better freight data generation for the state of Washington has been developed.

Significant challenges to policymakers and transportation planners are caused by the lack of data on freight movements, potentially leading to inefficient freight transportation systems. This research project for the Washington State Department of Transportation signifies a positive movement by WSDOT to address these data limitations and to develop a freight data framework and organizational structure to address these problems, allowing Washington to serve as a leader in the nation in this critical area.

As part of this initial endeavor, an exhaustive inventory of available freight data sources is listed and documented. This current information is concentrated, characterized and presented in five tables that will be available on WSDOT's web site.

A survey of other state Departments of Transportation freight data usage and needs throughout the U.S, summarized by policy, planning and project specific applications and the freight data limitations, provides national perspectives. A consistent theme of limited information on freight congestion, time delay and volume related performance information by highway type and mode was evident. Also, the difficulty in accessing data on emerging alternative fuels was prevalent as well, along with the problems of shortline rail abandonment and obtaining information on local rail freight movements.

The Washington State in-state freight data users and needs, investigated with two freight data discussion group meetings held within the state, one each on the west and east side of the state, identified current freight data uses by area agencies/freight clientele and captured the needs/gaps facing these freight constituents. It is evident that a wide array of information is utilized by these agencies throughout the state, with some common freight data challenges expressed by most participants. The detailed responses for each organization for both freight data uses and needs are presented in Appendix A.

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Finally, a summary of the freight data gaps, tools and approaches to addressing these gaps is offered. This information is categorized and presented from several different dimensions, including geographical (international, national and state), type of need (global movements, made in Washington and getting the product to the consumer) and by mode. This data evaluation lead to the development of the proposed freight data framework for the state of Washington, and a process over time by which these freight data needs and gaps are addressed into the future. When implemented, this proposed freight data framework could serve as a model to other Departments of Transportation throughout the U.S.

APPENDIX A

Table A.1: Western Washington Freight Data Discussion, Current Data Uses / Sources

Agency	Data Sources Utilized	Primary Use		
		Policy	Program/Planning	Project Level
I. Port of Portland	1. Portland-Vancouver Commodity Flow Forecast (41 Commodity Categories, by mode, projected into future, done every 5 years.	X	X	X
	2. BTS Commodity Flow Forecast (US) (State to State): not useful as information broken at state line.	X	X	X
	3. Regional Trade Capacity Study. Was done once last year, may continue; analyzes future capability, land use planning.	X	X	X
	4. Regional Freight Data Collection Project: truck surveys at weigh stations and ports of entry, warehouse survey. Purpose to improve metro's truck model, truck counts.			
II. Port of Tacoma Dave Slade, POT ITS lead Data purpose: - Support expansion plans - Eliminate bottlenecks	1. PIERS Data. Covers: container tonnage TEUs for west coast, auto for U.S., break-bulk, not grain, has six-week lag time, includes full containers and partially full; done annually since 1993.	X	X	X
	2. Washington Public Ports Assoc. Rail Capacity Study	X	X	X
	3. Washington State Transportation Commission Rail Capacity Study	X	X	X
	4. Comparative Port Studies on Truck and Road Traffic: surveyed what six other ports did.	X	X	X
	5. Comparative Port Studies on Rail Capacity and Rail Movements: surveyed four other ports.	X	X	X
	6. Portland Metro Data	X	X	X

	7. Regional Freight Data Collection Project (Port of Tacoma Specific): Heffron study. 8. PSU Portal Data (AEI, Customs, goal was triangulation using data from readers on port grounds; Business Exchange System) 9. Parametrix: one time study. 10. Regional Transportation Council = RAMP uses their data 11. Port of Portland 12. BNSF website 'Business Exchange System': real time info on number of trains/port.	X X X X X X	X X X X X X	X X X X X X
III. SDOT	1. FGTS 2. Individual truck counts 3. Alaskan Way Viaduct (WSDOT)	X	X	X
IV. Whatcom COG IMTC Data purpose: <ul style="list-style-type: none"> Improve functions of ports of entry 	1. U.S. & Canadian customs: truck counts bi-directional flow. 2. Rail Study by IMTC: infrastructure investments, BTS, Reebe; 2003 modeshift opportunities. 3. Short Sea Shipping Study (Transship, SFTA, tonnage flows, used TransSearch data). 2006 modeshift opportunities. 4. Commercial Vehicle Intercept Study (at ports of entry, border). 1999/2000 5. Sampled U.S. Customs manifests (drivers, carriers, companies). Origin-destination commodity (as part of FAST border). 6. Canadian National Roadside Survey/CCMTA, border component, NRS commodity O-D, sampled one week/year in 1999 & 2006 7. Truck Processing Study studied queuing at border: IMTC, Western Wash./BPRI, Transport Canada	X X X X X	X X X X X X	X X X X X
V. Port of Seattle	1. Duwamish Access Study: truck		X	X

<ul style="list-style-type: none"> Focused on area within the harbor 	<p>intercept. Feeds Heffron model used for POS Container Terminal Access Study, Duwamish ITS System, 1998.</p> <ol style="list-style-type: none"> PSRC Truck Model WPPA Rail Study Container Cargo Forecast Study EModal tracking RFID on every container. 		<p>X</p> <p>X</p> <p>X</p> <p>X</p>	<p>X</p> <p>X</p> <p>X</p> <p>X</p>
<p>VI. FMSIB (Partnering with different agencies, freight mobility and investments)</p> <p>Data purpose: Build freight projects and measure project investment outcomes</p>	<p>Note: local cargo movements vary a lot based on day of week, time of day, season.</p> <ol style="list-style-type: none"> Rely on many sources for data. Marine Exchange (counts all vessels, including cruise ships, coming and going at ports). SAIC Study, FHWA (should be complete and published). Tested process to count trucks by GPS, video, chasing trucks, loops via FHWA grant; used volunteer truck carriers with transponders. Private Trucking Companies Data Collection, Effort (\$300,000). Proposal in 2007 legislative budget to buy Nextel data to monitor truck performance. 	<p>X</p> <p>X</p> <p>X</p>	<p>X</p> <p>X</p> <p>X</p>	<p>X</p> <p>X</p> <p>X</p>
<p>VII. PSRC</p> <p>Data purpose: Regional projections, forecasting</p>	<ol style="list-style-type: none"> Truck Model (projects truck trips into TAZs which are geographic areas, built on employment security data, NAICS codes, primarily long range planning, validated from WSDOT truck counts, updated every three years) <p>Weakness: When actual truck trips don't match NAICS code, for example the air cargo industry at SeaTac.</p>	<p>X</p>	<p>X</p> <p>30-year planning</p>	<p>X</p> <p><u>Many other agencies use it</u> for projects; the four counties' agencies have agreed to use it as standard base model for forecasting.</p>
<p>VIII. WSDOT</p>	<ul style="list-style-type: none"> One-on-one interviews with high volume shippers and carriers CTED import/ export data for Washington State 	<p>X</p>	<p>X</p> <p>X</p>	<p>X</p>

	<ul style="list-style-type: none"> • WSDOT Transportation Data Office for truck counts on highways • WSDOT and local agency project information, when available, for high priority freight projects • Ports and local jurisdictions for any available counts (volume, growth projections, multimodal) and information on freight transportation system performance and needs • SFTS survey information and commodity reports • WA Department of Revenue for value of freight shipments • Agency/ Division sponsored freight customer survey research, location counts, and supply chain analysis • State/ national industry organizations (Dept of Agriculture, Potato Commission, etc.) for published commodity and industry research/ data • BTS and national data sources for port, border volumes, and international trade data • OFM for current and predictive trends (population, industry employment, trade) – state and regional level 			X	X
				X	
		X		X	X
		X		X	X
		X		X	X
				X	X
				X	X
		X			
				X	

Table A.2: Western Washington Freight Data Discussion, Current Data Needs

Agency	Primary Data Needs		
	Policy	Program/Planning	Project
I. Port of Portland	<ul style="list-style-type: none"> Take a broader perspective (related to freight movements in the region) because we don't want to create bottle-necks elsewhere. Going after federal research dollars and projects may be better if we join as a region. Partnership with Metro is how they generate their own data on freight movements. 		
II. Port of Tacoma	<ul style="list-style-type: none"> Regulatory requirements on emissions. Congestion modeling. The ports have completed many capacity / growth studies.....no need to reinvent the wheel. 		
III. SDOT	<ul style="list-style-type: none"> Daily truck volumes and percentage of daily traffic AM and PM Peak period volumes and percentage of peak period traffic. Time of day truck volume variations. Truck classification counts on selected routes to determine the mix of respective truck classifications. Commercial vehicle volumes (these are vehicles used for commercial purposes) as compared to truck volumes. Economic data: <ul style="list-style-type: none"> Commodity flow Cargo value Oversize/over dimensional vehicle trip demand Breakdown of traffic by FHWA truck classification and measured axle weights by classification Load zone availability and utilization Vehicles that may exceed the legal axle load Truck travel time studies Change in number of trucks and drivers to mitigate the negative impacts of growing congestion Intermodal yard rail and truck volumes Local rail service (to industrial properties) frequencies Number of truck trips generated by the Port of Seattle, travel routes, time of day characteristics Current truck counts on state highway system with origin-destination, higher quality data. Air cargo: truck. 		

IV. WSDOT	<ul style="list-style-type: none"> • Reliable and more comprehensive truck counts. Currently not available for small trucks serving local distribution, not available on all highway segments, usually not available on local roads. • Information on urban freight system – delivering goods (O-D and flow information, predictive trends, volumes, performance measures that matter to system, current performance and primary constraints) • Current and predictive information by industry segment to understand current system and future transportation needs, trends, and impacts • Freight performance measures that matter to customers: manufacturing, agribusiness, construction, timber/wood products, wholesale and retail distribution sectors, and trucking, rail, barge, air cargo, freight integrators and logistics sectors. • Multimodal, project and policy level benefit – cost analysis and economic impact data • By industry segment, complete supply chain audit to determine primary problem in the transportation system for customer (i.e. travel time, cost, unpredictable delay) • More comprehensive freight – related air quality information by source and benefit cost analysis of strategies • Criteria for determining priority freight corridors for corridor analysis and project design • For project and corridor analysis: freight customer information for corridor, customer performance needs, growth projections, etc. • List and ranking of primary truck bottlenecks and design constraints • Design options to meet truck performance needs on priority freight corridors
V. Port of Seattle	<ul style="list-style-type: none"> • What are we going to do with the information (let that determine what we collect, organize, compile...model...etc.) • Use this information to convey the message that Freight drives the economy and our current existing infrastructure needs to be maintained, improved, expanded.....etc. • The political component is the message related to the loss in economic productivity if we don't invest in infrastructure. • Given expected growth in freight traffic.....what are the impacts. • Need to explain this to specific constituencies. • Focus on the retailing and drayage firms (top 10, 90/10 rule). • Export companies • Air Cargo Truck Movements are a big component for regional movements

VI. Port of Vancouver	<ul style="list-style-type: none"> • Need better information on truck counts, o-d info on specific corridors, highways, commodities. They are currently getting small pieces of the picture from different agencies. • As technology improves, and tolling becomes prevalent, can't we use these technologies to build databases.....perhaps things that are already underway (Port of Tacoma is also doing this) • Get the info/data on PSU related to I-5 freight movements (volume and velocity).
VII. Whatcom Co.	<ul style="list-style-type: none"> • Better partnerships with the private companies (strategic partnerships) related to backhaul opportunities, empties, etc. • Need annualize tonnage information by mode. • Itemize performance objectives. • How to incentivize the private sector related to information and movements.
VIII. Northwest Container	<ul style="list-style-type: none"> • Do not use much state or local information. Because they work directly with the private businesses.
What do we need?	<ul style="list-style-type: none"> • Location of shippers, o-d, routes, commodities, types of vehicles, time of day, business type,

Table A.3: Eastern Washington Freight Data Discussion, Current Data Uses / Sources

Agency	Data Sources Utilized	Primary Use		
		Policy	Program/Planning	Project
I. Benton-Franklin County RTPO	1. EWITS / SFTA	X	X	X
	2. Washington Transportation Plan	X	X	
	3. WSDOT Annual Traffic Report/Counts	X	X	X
	4. FGTS Data	X	X	X
	5. Major Employer Report	X	X	
	6. FHWA Reports: Freight Facts and Figures	X	X	
	7. Marine Cargo Forecast			
	8. Local Collection of Port and Airport Freight Movements	X	X	X
II. Washington State Potato Commission	1. Funding private study to collect information on potato movements (fresh/processed) (goal is to conduct every two years).	X	X	
	2. Production information from NASS.	X	X	
III. Port of Seattle (eastern wa)	1. PIERS	X	X	
	2. Relationship with large port/container customers (Anderson Hay) to help understand demand for port traffic heading through the port.	X	X	
	3. Comparative Price Analysis (Quincy / Tri-Cities) on request.	X	X	
IV. Palouse RTPO/EDC (Whitman, Asotin, Garfield, Columbia Counties)	1. Currently funding study to capture/collect freight information from shippers/freight movers (every 3 to 5 years).		X	X
	2. Currently funding study to identify how roads are designated all-weather roads (road standards for county roads specifically).		X	X
	3. Compile information from county engineers regarding large firms/companies that may be shipping freight (collection of grain elevator	X		X

	/storage locations, 1994). 4. WSDOT Video of Pavement Conditions.	X	X	
V. CTED (eastern WA)	1. Port of Seattle (H. Granger) 2. EWITS/SFTA 3. Information Dissemination/Broker is primary role.			X X X
VI. North Central RTP/MPO	1. State Road Traffic Counts 2. Northcentral RTP Study on Canadian/Washington Freight Movements (Wood/Natural Resource Products) regarding where/when products are moved.			X X
VII. Kootenai/Spokane MPO/RTPO	1. In-house survey to collect information related to travel demand model. 2. Inland Pacific Hub Analysis (Legislative Request, ID, WA and DC). Anticipation of current freight infrastructure and future freight traffic (Avista Project). 3. Road Standards Study for these counties as well.	X X X	X X X	X X X
VIII. Yakima Council of Governments and Spokane	1. Did their own O-D study several years ago.			
IX. Other EDC folks collect information on targeted business/economic opportunities.	1. Comprehensive Economic Development Strategy (CEDS) Compile narrative information related to emerging economic development districts and how the business landscape is changing in each region. Each EDA conducts this each year (mostly internally developed).			
X. WSDOT Freight Office	Currently conducts surveys at area meetings throughout each region.			

Table A.4: Eastern Washington Freight Data Discussion, Current Data Needs

Agency	Primary Data Needs
I. Benton-Franklin County RTPO	<ul style="list-style-type: none"> • Detailed information, up to date, conducted consistently and frequently on county road shipments, commodities, volumes, counts and collected in comparable time periods. • Information on rail abandonment. Identification of shippers on the line, what they haul, when they haul, and what would happen if these lines were abandoned. Currently do this about every 10 years. • Information related to importance of the dams to freight/economic activity to the region and beyond. • Has there been any research conducted on designated truck lanes on I-5 in order to relieve congestion and improve freight efficiency?
II. Washington State Potato Commission	<ul style="list-style-type: none"> • Better information related to projections on different freight modes, infrastructure, freight system efficiency relative to the needs of the folks in the potato industry. What are the state/feds prioritizing. • What are the state/fed priorities on different modes, infrastructure, relationships/partnerships with other states. • How did policy lead to the current concentration of two stadiums, an international port, downtown business and how does policy change this?
III. Kootenai/Spokane MPO/RTPO	<ul style="list-style-type: none"> • Accurate employment data is very difficult to obtain from the Dept. of Revenue. This data is used for building traffic demand models. •
IV. Port of Seattle	<ul style="list-style-type: none"> • At what point in time will the Ports ask WSDOT they are tired of seeing these trucks on the road? • Is it WSDOTs responsibility to shape/guide this policy to move freight onto other (rail/water) modes to relieve congestion in the Seattle/Port Urban area?

V. Palouse Economic Development Council	<ul style="list-style-type: none"> • In addition to truck freight movements, we need information on all modes of freight movements (rail, water, port, airport). • Could use better access to information of rail information relative to shortline regulation. Could the state use this contractual relationship to collect information related to each operator's freight movements. • How do we collect/access information related to factors outside our state borders that have dramatic consequences to freight activity within the state?
VI. North Central RPTO	<ul style="list-style-type: none"> • Truck count numbers, commodities, vehicle configurations on a more consistent basis and more frequent. • Rail data and analysis for shortline movements and abandonment impacts for freight currently moving on those corridors. • Better coordination related to truck weigh stations, rest stops, fuel stations (predicting truck traffic patterns to do a better job of planning infrastructure investments. • Intersection of truck passing lanes on hills since private trucking has trucks that are more powerful and perhaps don't need passing lanes. • How does truck safety and inspection impact. • Will BNSF get double stack containers moving through stampede pass and how will this change the freight picture?
VII. WSDOT	<ul style="list-style-type: none"> • Need to include the economic realities of each regional economy relative to the freight characteristics within and across each region. • Many of the cities and counties have data, perhaps the Association of Cities and Counties should develop a standardize process for collection/compiling data on a regular frequency.